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A street in Tebbes.

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BY

SVEN HEDIN

WITH 308 ILLUSTRATIONS FROM PHOTOGRAPHS, WATER-COLOUR SKETCHES, AND DRAWINGS BY THE AUTHOR AND 2 MAPS

IN TWO VOLUMES

VOL. II

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CHAPTER XXXV

ON THE BORDER BETWEEN THE SANDY DESERT AND THE KEVIR

JUST as we were setting out on February 19 a small caravan arrived from Khur on its way to Cha-meji. Its leader warned us most emphatically not to cross the great Kevir bay, which would certainly be under water in some parts, and where in any case we should quite ruin our camels. Ah, well, we thought, we shall see when we come nearer, and we marched on in good but cold weather (38.8° at seven o'clock) and under a sky streaked and mottled by small white clouds in quite the same regular arrangement as the small ridges and lines in the sand of a shallow lake. Small dwindling rain-furrows ran towards the east-north-east, and on the right we left a small longish pool formed by rain-water. Beyond the eastern point of the range of hills on our right now appeared another higher range with snow on its crest, called Kuh-i-pusht-i-badam, while to the south-east the country was quite flat and open, and to the east-south-east was seen a hill called Kuh-i-rabat-i-khan.

Our march brought us to a bay, 300 yards broad, of the isolated kevir which surrounded the small pool. It would have taken us only a few minutes longer to go round this little bay, but Habibullah, who walked in front, marched fearlessly forward and the caravan followed. But the farther we proceeded from the shore the softer the ground became. The camels tramped down quite a trench of mud and slime and soon sank in up to their knees. And they sank still deeper at every step. A camel fell in the first detachment, but got up again without help. Then the next

in the row, the large dark stallion, which was carrying four sacks of straw weighing 100 batman, came down. But he fought bravely and composedly with the treacherous mud, was urged on with cries and blows, and splashed and tramped on with long active steps, till all at once he sank in to the belly, and lay as though stuck fast in a mould.

General commotion! All hands hurry up. The camel's load must be taken off and carried ashore by the men, and then by the united strength of the men and not less by his own intelligence and energy the animal is raised from the horrible mud-bath, which might have cost him his life. He is then led quietly and steadily by a roundabout way to firm land with the mire hanging and dropping from his belly and legs. He is summarily scraped clean and loaded again, while the other camels are brought along a surer path over this treacherous ground. Not once in the great Kevir had we passed such a slough as this, but I had another illustration of the peculiarities of the kind of ground Persians call kevir. The small arm we are now crossing has been softened and disturbed by the recent heavy rain, and has also a large admixture of sand. After a week of sunny weather the surface would become hard and unyielding, forming a tough crust over the slough. Under such conditions as these, it is easy to understand that a caravan which goes out into the Kevir in good weather and is caught in heavy rain in the middle of it, is exposed to the greatest danger. In ground such as we have just tested, even the strongest camel, though relieved of its load, is sucked under in a few hundred yards.

We had at any rate learned a useful lesson, and saw that we must travel round the large Kevir bay, from which we were now separated only by a sandspit. It was better to keep to dry ground rather than run such great risks to save a trifle of 6 farsakh.

We cross in a south-easterly direction the spit of firm ground, which is covered with coarse sand and small dunes with or without saxaul and shrubs, and come to the western edge of the great Kevir bay, and see the outlines of the hills standing on its eastern side in light but distinct tones.

127. A Group in Khur.

128. Boys of Khur.

The bay lies between like a great fiord, and a hasty glance over it is sufficient to convince us that it is absolutely impassable. As usual, various belts of different colours are distinguishable. The yellow are half dry, the white are covered with a sheet of salt, while the dark brown, almost black, are sodden and would not bear the weight of a camel; but worst of all are the blue areas, which simply indicate shallow rain-water still remaining on the surface; they lie at a distance of 2 to 2½ miles from the firm shore.

A singular and unusual as well as a slow and wearisome country awaits us during the rest of our day's march. We go towards the south-east. On the left stretches the Kevir, to the right a belt of more or less compact blown sand. The limit between the two is so sharp that it can usually be determined within a span. And this boundary does not run in a straight or slightly curved line, but is, on the contrary, as jagged as a saw, while an unbroken succession of dune spurs open out before us separated from one another by equally sharp kevir creeks. The sandspits are fairly flat and spoon-shaped, and their extremities pointing north or north-north-east are rounded off. The dunes are often held together by saxaul and shrubs, and their windward and leeward sides cannot be distinguished. Sometimes there are steps on their flanks, and in the Kevir creeks are seen concentric zones of different shades, probably lines of unequal desiccation. The rounded sand-dunes contrast sharply with the level dark brown Kevir.

It is evident that such a formation of the ground must be very difficult for travelling. If we try to cross a deeply indented Kevir creek, the first camel sinks in the mud and draws back hastily, and we have to go round. The line of march, therefore, becomes an undulating line in a horizontal plane. And if we cross the sandspits it becomes an undulating line in a vertical plane. Actually it is a combination of the two. There is in general no road or path, partly because here travellers march where they like and partly because the tracks are swept away by the wind.

The hills in the south-west, Kuh-i-khonche-datkin, Kuh-i-surkh, and Kuh-i-irech, merge more and more together, and now look like a single continuous elevation with a little

snow. But in front of us there is no change in the landscape, the sharp jagged coast-line runs on south-eastwards, while the sand, however, becomes ever higher and more barren. The dunes are now 100 feet high, and sometimes we can go for ten minutes along the top of a sandhill as on the bottom of an upturned punt. A small detached bit of kevir, surrounded on all sides by high dunes, is left on the right. Another is larger, and some isolated sand-hills stand up in it like islands in the middle of a lake. Three more such kevir flats without sand are passed. It seems as if the sand were heaped up on a substratum of kevir, which, if such is the case, must be firmer than elsewhere to be able to bear the burden. Possibly the sand covering protects the material of the kevir from atmospheric moisture, and promotes desiccation to a greater depth. The small detached hollows of kevir have formerly formed parts of the great Kevir bay, but the sand has encroached and they have finally been enclosed in it.

The last detached kevir flat we pass is drawn out from WSW. to ENE., and on its flat surface stand two cairns marking the route between Yezd and Tebbes, the last stage being Mehrijan. Five such *nishan* or way-marks have been erected by Parsis from Yezd within the sandy belt, to guide travellers in foggy weather. No other sign of a road is visible. After rain men have to travel through the sand, but at other times they try to make use, as far as possible, of the flat kevir flats, which here play the same part as the *bayirs* in the desert between Cherchen and Tatran in Eastern Turkestan.

The sand is of two shades, a lighter and a darker yellow. The latter is wet, the former, which lies chiefly on more exposed convex surfaces, is dry. When the wind sweeps over them, the dry light sand may be seen spreading itself over the dark. The dunes now become lower, and are clothed with vegetation. We try to cross a kevir creek. It bears, and also the next, and for the rest of the day's march we can keep outside the sandspits. It proves that the Kevir at this part consists to a large extent of sand, and therefore as long as it remains dry bears better than elsewhere, affording us an excellent path where we are no longer obliged to go

in and out. Here the same struggle goes on between the Kevir and the driftsand as between driftsand and water in Eastern Turkestan; but it is the sand which gains ground, and the level surface of the Kevir which is contracted and grows less. If we compare the conditions in the Kevir with the Takla-makan we shall involuntarily come to the conclusion that in both cases the same effective work of transmutation is in progress, caused by weathering in association with changes of climate and the transporting action of wind. But in the two lands the transformation of the earth's surface is at different stages. In Eastern Turkestan the blown sand has spread and piled itself up in huge quantities, so that only an insignificant and vanishing part of the ground is bare. In Persia the bottom, that is, the ground of the Kevir, is still incomparably more extensive than the sand-belts on its margin. If the change of climate continues in the same direction as now, that is to say, towards a higher degree of drought, it may be taken for granted that the slough of the Kevir will lose moisture and afflux of water, and in time will become firmer, and that the driftsand will with greater ease extend and firmly establish itself. Undoubtedly the physical geographical changes now in progress will end in entirely converting the Kevir into a sandy desert of the same kind as in Eastern Turkestan. And we can, on the other hand, draw the inference that Eastern Turkestan, after having been at one time a part of the Central Asiatic mediterranean sea, was gradually filled up with finely disintegrated products of weathering of the same kind as in the present Kevir, and that its solidified lake of wet mud and clay was finally dried and hardened to such a degree that it could bear the weight of the encroaching sand. And that the sand was formerly of less extent than now is proved by the archæological discoveries of myself and other travellers. The substratum laid bare in the *bayirs* of the Cherchen desert strongly reminds one of the ground of the Kevir. In both cases it is dark, fine matter, forming an almost plane surface. In both cases this material, when mixed with water, is transformed into a slough in which a man sinks beyond recovery; but in Eastern Turkestan the ground-water

stands at a greater depth, and as rain is there exceedingly rare one can go with impunity anywhere over the level *bayir* ground.

I by no means regretted the long détour round the southern edge of the great Kevir bay, for by this means we learned all the details of the coast-line ; every sandspit was inserted on my map, and for a long time to come any traveller who takes the trouble to follow the same shore, will be able, by a comparison with my map, to draw correct conclusions and determine in which direction and to what amount the sand-belt is extending.

Farther south the Kevir creeks penetrate less deeply between the sandspits, and before these lie small exposed sheets of water. At length we leave the sandy coast at a still greater distance, and make straight for a promontory in the south-east. But suddenly an unexpected change presents itself, for before us lies an extensive sheet of water. The caravan leader takes off his boots and convinces himself that the ground beneath the water will easily bear—it consists of close sand ; and then the camels splash cheerfully into water a foot deep. Regular waves lap round the ships of the desert, and the caravan presents a strange and picturesque spectacle as it marches right across the shallow lake.

That the usual way really passed through the water was shown plainly when we met in its midst a caravan of twenty-five camels, which was returning from Turshiz to Khur and Germe with a load of wheat. One of the men in this caravan told us, as he passed, that he and his comrades had been attacked at the last camping-ground, that is, the previous evening, by four armed robbers, who were carrying stolen goods on a camel. Whether these disturbers of the peace held the men of the caravan in respect because they had a gun to defend themselves with, or whether they were influenced by philanthropic feelings, at any rate, they confined their plundering to the caravan's reserve of powder and ball and demanded nothing else. This story made a deep impression on my men, and all the evening they talked of nothing but tales of robbers.

The point we were steering for turned out to be too far

129. Hunter at Hauz-i-hatan.

130. Sand and Saxauls, near Chemgert.

off, and when the leader thought that we had gone far enough after 8½ hours' march, he changed his direction and turned in towards the shore, crossing a belt of slippery mud. We set up our tents at the foot of a dune, quite 130 feet high, where saxaul as tall as trees grew. The locality is called Chemgert. The height was 2539 feet.

The first thing I do is to go up the dune, from the top of which I can command the whole horizon. I have an expert with me who tells me the names of all the hills in sight, and points out in which direction the various roads run. Then I descend to inspect the camels, who haughtily and indifferently sniff at the chopped straw before it is mixed with cottonseed, but afterwards eat it with the keener appetite. I make sure that the dogs and fowls get their meal—we have bought a cock and some hens in Khur, which run about picking and cackling between the tents, and give the camp a homely and rural air. I stand a while at the men's fire where two wanderers with an ass from Khur are entertained. Like ourselves, they are on the way to Tebbes, and they ask if they may be allowed to accompany us, as they are so afraid of robbers. Certainly, with pleasure. The Cossacks sit and clean their rifles and keep their ammunition handy, and propose that a night-watch should be kept at the camp. For my part, I have no belief in robbers. Twenty years ago I travelled backwards and forwards all through Persia without a single retainer, and was never molested.

The morning of February 20 promised nothing good, and before noon its promise was fulfilled. When I went out before seven o'clock the sky was covered with a dense uniform mass of clouds, and there was a fine drizzle. The minimum thermometer marked 37°; at seven o'clock the temperature was 42.4°, at one o'clock 43°, and at nine o'clock 37.8°. While I was walking briskly on foot in advance the rain increased, and at nine A.M. it was so thick that I mounted my tall camel, took my ulster, and wrapped a couple of rugs round me. It felt quite cool in the searching northerly blast, which increased as the day advanced.

As yesterday, we follow the coast on hard, excellent

sandy ground, and pass again a succession of spits. At a point where the road forks we halt for a consultation. A distinct path runs east-north-east right across the Kevir, cutting off the southernmost part of the large bay. The other path continues along the sandspits towards the south-east. One of our guides believes that the direct road will bear and will save us at least a farsakh, and Gulam Hussein says that it will save us a good hour. But as the caravan we met yesterday had closely followed the coast, I consider it more advisable to take the longer way, whereby also I shall be able to complete the map of the bay's contour.

The ground of the Kevir now becomes lumpy and black, but it is so mixed with sand that it bears in all parts. A thin sheet of salt covers the south-eastern side of every hillock, and a little way out from the coast to the north-west the surface looks white, while to the south-east it is dark. It is as though hoar-frost or drifted snow were beginning to collect in the lee of the obstacles.

Along the shore saxaul grows freely, though in smaller bushes than on yesterday's journey. At length we come to the southern part of the great bay and turn east, thereby cutting off a considerable point of the bay. We gain a little by it, but we have seen before a number of other such ways leaving the coast to cross the Kevir. It depends on the time of year and the weather which of them may be used. The most advantageous is the most northerly, which we saw yesterday, and which shortens the distance to Tebbes by 6 farsakh. But in such weather as we have now we should have a feeling of uneasiness in leaving the shore to march out into a bay, which might not bear in the middle —it would be like leaving a sheltered coast under close-reefed sails with danger in sight.

Before a sandspit stood a sheet of water which might be drunk in case of necessity, and was good enough for the camels. But then the ground became so soaked and muddy that we preferred to skirt the edge of the sand, where a herd of camels was grazing and excited the tall dark camel at the head of the caravan. He gurgled softly and sadly, and longed in vain for his "lady of the camellias."

131. On the Sand along the Southern Kevir Bay.

132. On the Boundary between the Sandy Desert and the Kevir.

And meanwhile the rain pattered on the sand and was lost. In Turut the rain was local, and it rained, as could be seen, in half-a-dozen different places at once. But here it was general, and rained with equal intensity as far as the eye could reach, and continued without a moment's interval all day long. Strange country! A constantly overcast sky, abundant precipitation, not a glimpse of the sun—this is the last kind of weather I had expected in the eastern deserts of Haji Baba's land. Not a sign of the panorama of the hills that surround us near or far is to be detected. All view is hidden, and all kinds of work are harder. Photographing is not to be thought of; the map sheet becomes wet and pulpy; to read the compass and watch is more troublesome than usual, when I can scarcely take my hands out of my drenched pockets.

Many of the last Kevir creeks we have to cross run in farther than the others, and the last of all and the most easterly is the largest. In other respects also it is unlike its neighbours. It reminds me of a stunted *bayir*, skirted east and west by sand 65 feet high. Its bottom is hard and consists, at any rate on the surface, of hard compact sand. But the peculiarity of this creek is that it slopes towards the south, the direction to which its extremity points. I should not have noticed this circumstance, and never have thought of it, if it had not been that a stream quite a hundred yards broad and only half-an-inch deep on an average runs southwards. In places the stream is divided into arms by banks of mud some three-quarters of an inch high, but the current is so powerful that there is a tendency to the formation of small erosion edges. The ground falls then southwards, and it seems that the eastern basin of the great Kevir has a superficial drainage in this direction, though the phenomenon may of course be local and embrace a comparatively trifling area.

We crossed the creek and came to the eastern shore of sand, where our direction became due north, with large collections of rain-water on the left hand. We had, then, the suffocating north wind and pelting rain right in our faces, pattering on our clothes, and running in rivulets from them down the camels' flanks. I was so drenched that I had to

change every thread, even to my stockings. There was silence in the caravan, only the bells ringing as usual. Those who went on foot leaned forwards as they walked, and those riding sat on their camels facing the tail, so that the rain should fall on their backs; while I sat forwards for the sake of the mapping, and the rain pelted on the sheet. I became quite frozen and numbed in the hands, but I faced the trouble resolutely.

The germsir, the warm country, where even in winter a warm sun in a bright blue sky and wide views over distant hills in the light rosy hues of the desert might have been expected! Instead, the sky is leaden grey and the rain so troublesome that I must snatch at opportunities of photographing and drawing. Ever since we have come in contact with the Kevir the weather has been such as to persuade us that the great salt desert has the effect of forming and condensing clouds.

I was, therefore, anything but disgusted when Gulam Hussein asked if it would not be well to encamp. We might have gone farther, for we were already like drowned cats, but we could see nothing of the country, so I ordered a halt. Height 2687 feet.

We pitched our tents in beating rain, and every load was, so Meshedi Abbas declared, 10 batman heavier. It was not easy to make a fire; there was plenty of firewood, but it was so wet that we only succeeded after half an hour's perseverance with the help of paper and grass. And then a blazing fire crackled and hissed in the rain. My first care was to change my clothes and hang up my dripping garments with safety-pins on the inside of the tent canvas. The camels were sent off to graze on the saxaul. Fortunately they had still their thick winter coats, though they were soaked with water. The fowls were benumbed and half dead with the cold and wind, but they were given shelter in my tent where they sat meditating round the brazier, and were regaled with bread and water. I was soon myself again, and could use my hands for making notes and sketches. We had seen no robbers up till now, nor even any suspicious signs, but the Cossacks had their rifles and revolvers ready and when I awoke once in the preceding

133. Gulam Hussein and One of Our Camels.

134. The Caravan among Sandhills.

night, I had seen my tent lighted up by the ruddy flames of the watch fire.

At three o'clock the rain became a light drizzle, but in the evening one of the hardest northerly storms I have ever experienced broke loose, and now the rain again dashed against the tents driven by the furious blast. Everything had to be secured and firmly tied to prevent its being carried away, and nothing could be left about. I could do nothing better than lie down and read by a candle protected by a glass shade and a couple of boxes. The tent canvas was thoroughly wet on the inside, and drops filtered through its holes. A trench was digged around the tent to protect me from intruding rivulets. Large quantities of water must on such a day stream down from all sides to the Kevir. And I thought again of the plight we should have been in if we had delayed our departure a day or two from Turut. We should have been completely cut off from our return route, and even a circuitous march round the eastern margin of the Kevir would have been quite problematic, for we might be sure that the Kal-mura was much swollen.

How dull and dark it was when I went out at nine o'clock to take the usual meteorological observations! It had then rained incessantly for twelve hours, and the gale whistled like an autumn storm, moaning and piping through the bushes. The gleams from the men's large camp fire lighted up the tents, the baggage, the camels and their two watchmen, who sat cowering under their sackcloth cloaks and dozed round the blaze. They slept in the open in all weathers.

After two hours' interval, early in the morning, it began to rain again at seven o'clock, and the sky was black with clouds. But after an hour the weather cleared a little, and the sky's shroud of clouds presented the most fantastic relief in bluish-purple shades, with tufts, cushions, and bolsters, pure white heaps and dark tunnels, but the sun strove in vain to break through. We might have been travelling in a country where the sun in winter remained below the horizon, and yet we were in the land of the lion and the sun.

As usual, I walked on ahead, looking for the best

passage for the camels among the dunes, but I was soon overtaken by Habibullah, who told me in a patronizing tone that it was not well to go alone and unarmed in this *biaban*, where robbers might surely be lying in ambush behind the shrubs. He did not remember that he himself was unarmed, and would be fearfully scared if a band of robbers popped up among the dunes. After a while he was relieved by Abbas Kuli Bek, who carried his rifle over his shoulder. The Persians are steady and agreeable, but they are not heroes, and their imagination runs wild when they scent danger.

So we march on among knobbly dunes, thickly overgrown, often with actual thickets, and out on the desert large sheets of water shimmer after the rain of the night. A singular, very irregular creek of the Kevir protrudes into the sand-belt and is filled with shallow water. Outside the great Kevir is interminable with its north-western horizon as level as a sea, and yonder Kuh-i-gumbei still raises its clearly marked profile. Then we follow, as yesterday, the edge of the sand-belt at a distance of only a couple of yards from the shore of the Kevir, where long pools of water lie so near that I suspect that the weight of sand exercises a decided pressure on the less stable substratum.

The trail of two barefooted men and a camel excites my men's suspicions, and they march in close order, with their hearts in their mouths and their guns on their shoulders, expecting an attack at any moment. But this time it is only two innocent herdsmen, who are watching sixty camels from Anarek in the sand-belt. When the sand afterwards becomes flatter, a succession of small points and teeth of the adjacent range comes into view, and at its foot Chashirin, or the "sweet well," is sunk in the ground.

The ground is level, and we are very cautious not to leave the sand-strewn tract, but even this is not always to be trusted after the late rain. Then we have to cross a long Kevir creek, little more than a hundred yards broad, and strewn all over with sand and with a path where the caravan of yesterday passed. The first camel sinks in at once to its belly, and its legs bore into the soft ground like

pins into a cushion. Those behind make a hasty right-about turn, while the load of the unlucky animal is carried ashore. There is no time for thinking, for the camel, bellowing piteously, is slowly falling deeper into the mud. His legs are digged out with spades, and at last he makes a violent jump out of the mud-hole, but only to fall more hopelessly into another. Then all we have in the way of sacks and strips of felt are hurriedly brought, and dry stems of saxaul are broken off on the shore; and with this material a temporary bridge is constructed over the dangerous spot and the camel is rescued. After this experience we do not venture on any more short cuts for the rest of the day.

A small blue gap among the clouds in the zenith mocked our hopes of fine weather. I never saw such masses of clouds, and we could not help looking at them, they were so artistic and picturesquely formed, and presented a much finer sight than the surface of the land.

Some distance from the shore a small sandy islet held together by vegetation rises out of the Kevir, the only one we have seen in the salt desert. At this point our route joins the cross route over the great Kevir, the other western terminus of which we saw the day before yesterday. A peninsula of sand, called Pa-i-tagh, juts out into the desert, and at its base rise two considerable dune ridges, running as usual north and south. Here we turn to the east and leave the shore of the Kevir. The sand-belt we have had to do with during the latter days continues north-eastwards to Halvan and Dest-gerdun, and is said to stretch southwards for a distance of 12 farsakh more.

The road then becomes excellent, and is more distinct because it forms a bare channel between steppe shrubs and grass. But sandhills still continue, though much lower than before, and all drawn out from south to north. We leave on the right the sweet-water well Cha-naini at the foot of the nearest hill. And then something dark comes into sight in front of us,—the ruins of a small tower, with a *rabat* or rest-house with arched windows beside it, but no living inmate. Here is the well Cha-meji, where we pitch our tents. Height 2671 feet.

At Cha-meji there are nine wells in all, of which only four are in use. The one which provided us with water is round and bricked in with a diameter of 3 feet and a depth of 81 feet, and its slightly saline water had a temperature of 75° when that of the air was only 50°, so that it felt almost hot. A windlass with side pieces rests on posts at either side, and has a line wound round it. It is not worked by hand, but there is a chair-like contrivance of stone in which a man sits and turns the roller with his feet. The water is brought up in two small skin bags kept open by cross pieces of wood, and is received into a trough from which camels can drink.

The rabat of Cha-meji is said to have been built six years ago by a gentleman named Haji Mad Hussein Meherejani, and it is an important halting-place for caravans going from Tebbes westwards. At the edge of the Kevir, said to be half a farsakh distant, grows *siah-tagh* or "black saxaul," which is higher than a camel.

135. At Cha-meji.

136. Our Camp at Hauz-i-Sultan-Sar.

CHAPTER XXXVI

CARAVAN LIFE

It was a fine morning on February 22, with 43.2° at seven o'clock and 55° at one o'clock, and a fresh, almost strong, south-west wind had dispersed the last clouds left by the bad-i-Khorasan. Early in the morning, while darkness still lay over the earth, bells were heard and shouts in the distance, and a caravan of fifty camels passed by, carrying tobacco from Tebbes to Teheran. It marched past Cha-meji without halting, and we soon found that it had no need of water, when we came to a trench from Kuh-i-Darin in which large pools remained after the rain of the previous day.

The sand became lower, but lay still in the same knobbly flat hillocks, abundantly overgrown with a tamarisk called *eskambil.* In two places there were flocks of sheep with their shepherds; to them the rain is welcome, for they need not make long pilgrimages to wells, and the pasture is better.

At *ser-i-yek-farsakh*, or "the first farsakh," stands a cairn to give notice of the slightly saline well Cha-Abdul standing half a farsakh off to the north of the road. On the right the low hills continue, while Kuh-i-rabat-khan and Kuh-i-Darin are behind us; the tamarisks have thinned out, and in their place grass growing in tufts and clumps makes the steppe yellow. At the river bed we are now following a tobacco caravan from Tebbes is camping. The camels graze and the men sleep round their dying fire in the shelter of the piled-up tobacco bales.

Our course runs eastwards, and in front of us is seen

the summit Bala-ser-i-rabat-khan, which has been visible for two days. The ground changes, hard pebbly soil becomes predominant, and on it quite small dunes stand in rows. But farther on the sand increases again in a belt called Rig-i-dou-dou, but we can, by marching in zigzags, easily avoid the dunes, which are more than 13 feet high. The road forks, and its right branch goes to Darin and Tebbes. We take the left, for this road is better, and runs along the southern front of thinly overgrown dunes as much as 65 feet high, which hide the Kevir and its boundless expanse from sight.

We cross the Rudkhaneh-i-Darin with a bed now dry, leave the high sand behind us and come among low hills, where a small brook of partially clear water purls pleasantly and musically among the stones in its bed, an unusual sound. It comes from the snow which fell yesterday, and therefore will soon fail. Here the whole party halts, the camels are watered, and the men enjoy the fresh sweet water, quite a different fluid from that in the briny wells. My servants wash themselves for the first time since they left Teheran. A little farther on we cross the road from Yezd to Khorasan; it is a *shah-rah*, or royal road, a main artery for caravans and pilgrims who resort to the tomb of Imam Riza in Meshed.

The camping-ground to-day is called Hauz-i-Sultan-sar, and is situated at the eastern foot of a steep crest, in the flank of which strongly folded strata lie in fine exposures of various shades, sometimes light grey limestone, sometimes fine dark crystalline or compact. The reservoir is an open rectangular vat of stone, to which the water is conducted by a canal. The vat is now filled to the brim with water which stands and clears, and has a fresh bluish-green colour. Even if there is no more rain this supply will last at least three months; but usually there is some water in Hauz-i-Sultan-sar throughout the year, for the store is from time to time replenished by fresh rain. To-day, too, two small showers fall. At Hauzi-i-Sultan-sar we are at a height of 3225 feet, and therefore have mounted 554 feet during the day's march.

Habibullah had of late shown himelf more disagreeable

137. The Well Cha-meji.

to his comrades than ever, and when he was this evening taken to task by Abbas Kuli Bek for hitting a camel unnecessarily, he came and complained to me, saying that he did not need to take lessons in the treatment of camels from a paltry Cossack, and as he could not put up with it he begged for his discharge, which was the more willingly granted as the other men wished to be rid of him. They thought, however, that it was all pretence, and therefore were astonished when Habibullah appeared next morning in marching order, with all his belongings tied up in a bundle on his back, his cage slung by a strap across his breast, and his staff in his hand. He declared positively that he could not endure a day longer in the company of such a scoundrel as Abbas Kuli Bek and the other riff-raff, and that he meant to go home to his village near Ispahan. His business was transacted in a moment; he received two months' pay, though he had already been paid for one month in Teheran, and he was allowed to keep his cloak, though the other men thought that it ought to be passed on to any one who should take his place. And so he bade me "*Khodahafiz, sa'ab*," and set off back along our track without looking at his comrades.

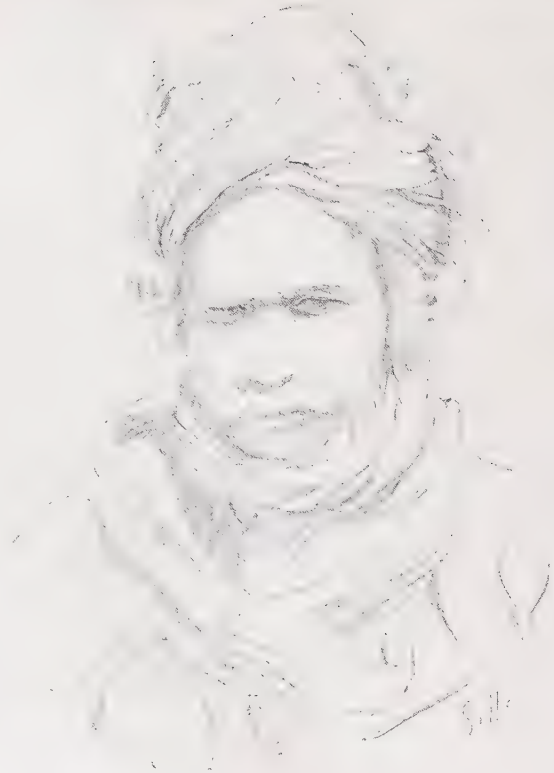
Between the hills on the right and the high sand on our left we travel on farther north-eastwards, and the road winds among small sharp ridges and summits, through valleys and over flat passes, and the distance from the high sand in the north gradually increases. But the clear outlines of the sand-hills are seen through the northern valleys, and the dunes seem to be higher than ever. Kuh-i-Halvan appears in faint red hues to the north-east; we had seen this hill for the first time from Turut, and afterwards from Khur. Now the wind blows strongly from the north-west and sweeps up the fine dust and sand, and the air becomes thick. The ravens that follow us croak anxiously, and it seems as though a storm were rising up. But the wind pushes on behind and helps the camels uphill.

When we leave behind us a sharply outlined summit and pass a small portal between two spurs, we see all at

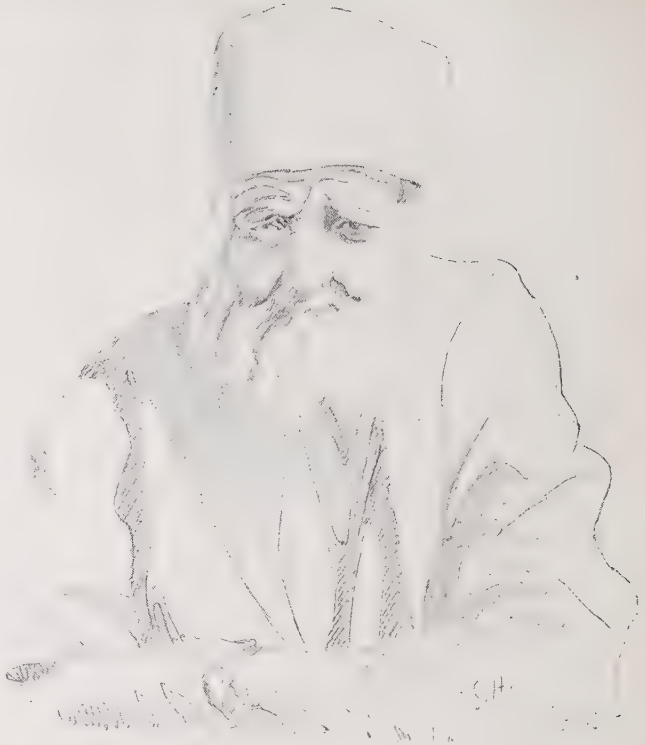
once the village Jaffaru, down below on the plain, with the usual burch, cupola roofs and a few palms, which are exceedingly strange in this icy wind. The village is surrounded on all sides by hills, which, however, leave an open space in the middle, and the country is open only to the north-north-east, and even here the Halvan hill forms a background in the distance. At its foot lies the village Halvan, which is said to contain a hundred houses and numerous palms; it is reckoned 6 farsakh to this village.

Standing at a height of 3593 feet, the new Jaffaru has been inhabited for thirty years, and consists of fourteen houses with seventy-two inhabitants, who grow wheat, barley, turnips, beet, melons, pomegranates, mulberries, figs, and a small quantity of dates. The subterranean irrigation canal starts from the adjacent hill. The village has 2000 sheep, 180 camels, 10 asses, and one mule. In its present condition it has been inhabited thirty years (up to 1906), but it is much older, though it was abandoned for a time owing to an attack of Baluchis. Its burch or little fort is said to be fifty years old, and was erected instead of an older one which had fallen into ruin. An old man, named Gulam Hussein, informed me that he had been kidnapped fifty years ago by Baluchis, and had been kept a prisoner for twelve months. The marauders had swept down like a storm wind on the unsuspecting village, and had loaded all the valuables they could find on their jambas or swift dromedaries, even human beings, and then had hastened on the long journey back to Baluchistan in fourteen days. But Gulam Hussein's father had, a year later, gone to the country of the Baluchis and ransomed his son for 150 tuman. The farther we travel eastwards in these districts the more frequently we hear tales of such adventures, and of the former raids of Baluchis on the peaceful villages of the Persians.

Ibex, antelopes, and gazelles occur in the country, and leopards are not rare. A pack of nine wolves had for a long time boldly levied a tax on the flocks of the village, and killed as many as 200 sheep in the year. But now seven had been killed by a hunter who gained a small income by his gun. When a hunter kills a wolf he goes round with his



138. Hussein Kuli of Jaffaru.



139. Gulam Hussein, 80 years old—Jaffaru.

booty to all sheep and camel owners in the neighbourhood and receives 2 kran from each. In this way he may collect up to 40 tuman for a single wolf; the same custom obtains also in Western Persia. When a wolf steals sheep from a fold the shepherds inform the nearest hunter at once, and he can easily follow the clear trail of the wolf, which drags the last sheep he has killed with him and stops at a distance of a farsakh to feast on his prey, and then sleep. The hunter steals nearer and nearer along the ground, and fires at a distance of 100 or 150 paces. The two wolves still left rejected all other food but mutton, but some of those which were killed had also gone for the camels. They leap on to the camel's back, crawl down to his neck and tear his throat. The herdsmen know very well how many wolves there are in the country, give them each names, and know whereabouts their haunts are. Leopards, on the other hand, are said seldom to attack sheep, but they lie in ambush behind a rock or stones and spring out on an ibex or gazelle.

Here, also, there was talk of wild camels in the Rig-i-jin, but no one had seen them.

This year the precipitation had been unusually abundant, and therefore the pasture would be rich and agricultural products cheap; in a word, it was a lucky year. With some difficulty we succeeded in obtaining 30 batman of straw, and as besides there was plenty of barley meal with which to bake loaves for the camels, we decided to spend a day in Jaffaru. It did not rain, but it was cold and raw, and after frost in the night the temperature did not rise above 43.9°, and next night we had seven degrees of frost.

It was difficult to induce the women of the village to sit as models; some agreed, but refused to let down their veils, and the three who sat only partly removed them. They excused themselves by saying that their husbands were away tending sheep and camels, and that they could not take any liberties during their absence. A young mother, with a child at her breast, had just taken her seat, when her mother-in-law came and drove her away with blows and stripes.

In the evening Gulam Hussein was badly bitten in the hand by our tall dark stallion, and the wound was bound up

well with antiseptic cotton-wool and a gauze bandage. He had so much pain that he lay moaning in the night, but after two days the wound was healed. Vicious camels may be very dangerous. I had from the first been on the most confidential terms with my riding camel; he would come up to my tent, put his head through the opening to get a piece of bread, and nosed quite familiarly about my pockets. I took his shaggy head into my lap and stroked his nose and eyes, and he never showed the least dislike to me. Our friendship became stronger every day that passed, and I dreaded the day when we should at last part far in the east.

On February 25 it was the turn of Jaffaru to be left in our wake, and the wagtails and larks sat on the small mean graves rejoicing in the brilliant morning. Not a cloud was in the sky, but the air was cool, 36.5° at seven o'clock, and when the road turned after a while to the north-east, we were thoroughly chilled on the left side in the shade and towards the wind, but warmed up comfortably on the right in the lee and in the sunshine. Behind us stood a finely arched saddle, truncated at the top, named Kuh-i-Jaffaru, and the range between Jaffaru and Halvan became more distinct; it is formed of a huge fold, of which, here the north-western and there the south-eastern half remains, and the strata dip in both these directions. The ground is hard and excellent for walking, scantily begrown with shrubs and intersected with furrows 3 feet deep and running northwards.

After travelling 1 farsakh we cross the great royal road from Shiraz, Yezd, and Rabat-i-khan to Meshed. It is clearly marked, and consists of several parallel tracks, and at the point of junction two cairns are erected. To the north-east and north-north-east still stands Kuh-i-Halvan, which appeared light blue from Khur, but is now pink and light red. The landscape is dreary and monotonous, and nothing else can be expected when the same low summits and crests are seen for hours together. Before us rises a reddish level-topped ridge with snow; the ground falls north-north-westwards, and in the same direction a transverse valley is visible in the Jaffaru-Halvan range, whither all the furrows converge to pass out into the sandy desert Rig-i-Halvan; at Halvan itself stands a hill like a red dome.

140. A Group in Jaffaru.

Before noon the wind veers round and blows for a time right in our faces, and the three men who are riding turn round to have the wind at their backs. If it is calm it feels warm in the sun, though the temperature does not rise above 48.2° at one o'clock. It seems as if winter and spring were contending for the mastery, and as if the latter were advancing from the coasts of the Indian Ocean, where it is a permanent guest, only giving place to a burning summer. But at present winter maintains not unsuccessfully its position in the north. The hills round Jaffaru are the *eilak* or summer pastures of Tebbes, where it is always fresh and cool compared with the stuffy lowlands round Tebbes. In due time we shall have more heat than we want, and then we shall perhaps look back with regret to the icy cold winds at Khur and Jaffaru.

We are in a broad open longitudinal valley, and when the fall, after having been north-westwards, becomes eastwards, we find that we have crossed a flat cross threshold without noticing it. Now the pink range before us shows up finely but faintly, and on its high crest the snow still remains in fields and patches. Before a large swell in the ground lies Tebbes, so that we have not much farther to go to the great stage on the journey through Iran, this longed-for aim of the two months' journey all the way from Teheran.

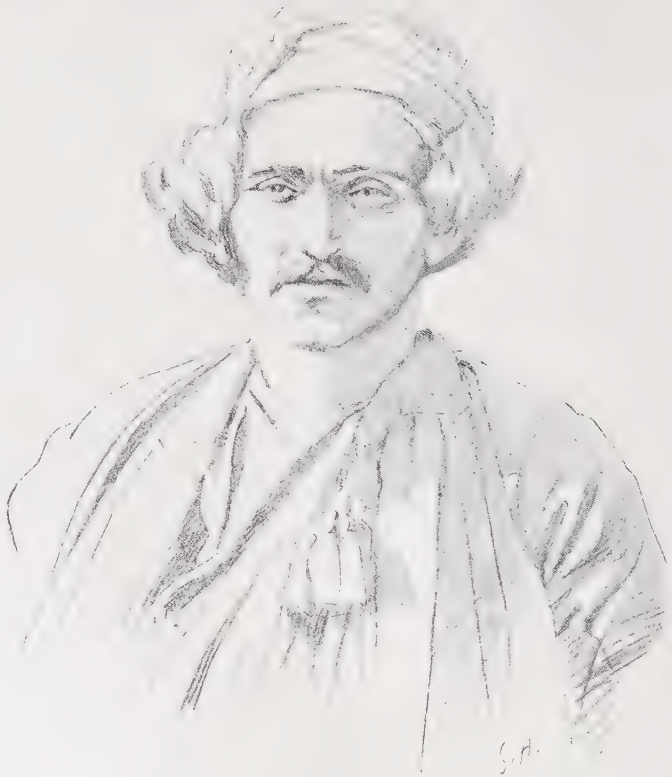
After a time the easterly slope of the country becomes perceptible both to eyes and feet. We come to another depression within which Tebbes is situated. West and north of the flat saddle in the longitudinal valley all the drainage channels are directed towards the great Kevir. It was, then, an important watershed we passed; and, what is most remarkable, the depression we now come to lies lower than the great Kevir. Its bottom to the east-north-east looks dark in patches, and seems to be a smaller subsidiary kevir. The scene now unfolding itself to the east is fascinating in its solemn dreariness. The rosy, snow-clad range beyond Tebbes thins out like mist to perish in the sea on the south, and its outermost spur stands like a projecting cape on the shore.

Beside the way is a cairn, and the men who are walking

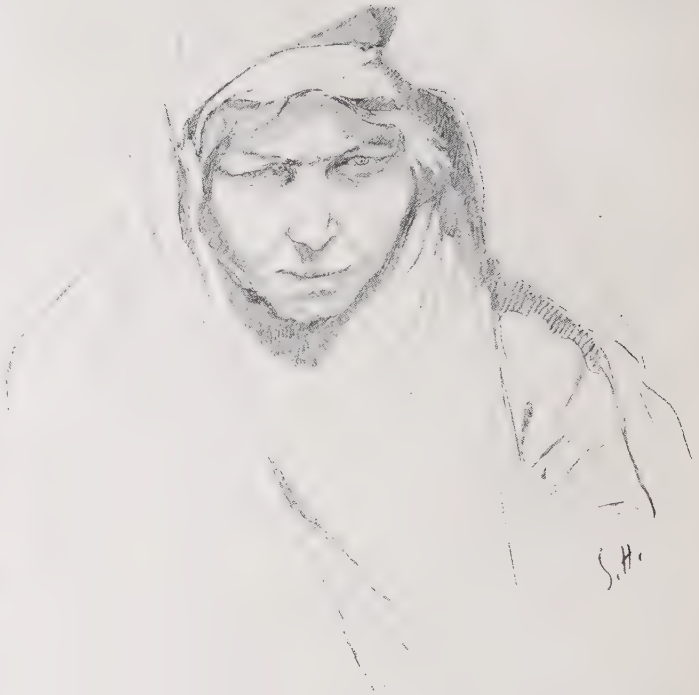
throw each a stone on the heap. It is a kind of votive-cairn, where each man presents his stone as a token of gratitude for having come safely so far on the road to Tebbes. An open-walled cistern, a little farther on, is called Hauz-i-nim-farsakh.

At length we cross a broad and deep main furrow also directed eastwards. At its right bank stands a ruined caravanserai, and a new caravanserai appears a little in front of us. And when we emerge into more open ground beyond a concealing projection, we see on the right new spurs and ramifications of the dreary hills, and far away in the distance, south-south-east, we have just a glimpse of another range which is said to be situated near Naibend. But between these hills the country is open, and there runs the road to Seistan, Baluchistan, and India. With some straining of the eyes we can make a guess at the position of Tebbes; a fine dark line is said to be its wood of date-palms. High above and far beyond this line rises the pink range Kuh-i-shuturi, with flat, snow-covered summits and masses, and this side of Tebbes extends a desert with a surface whiter than snow.

At last we pitch our camp before Rabat-gur or the "wild asses' caravanserai," and here have descended again to an altitude of 3150 feet. The caravanserai is well built of burnt bricks, mostly taken from the ruins of the older caravanserais in the neighbourhood. It was erected fourteen years ago, at the expense of a rich merchant of Yezd, Haji Mirza Hussein, and is said to have cost 4000 tuman. The travellers who come here in winter when it is cold and windy and can creep into its lee and find shelter in its numerous rooms and niches, and those who travel in the burning days of summer and find a refuge from the heat in the cool shadow of these same niches—all ought to appreciate the liberality of Haji Mirza Hussein and pray, "Allah rest his soul!" The custom of purchasing salvation after death by the erection of a caravanserai has its counterpart in other countries not in hotels but in hospitals; and in any case the bequest of the testator provides great convenience and alleviation to innumerable travellers on their toilsome journeys through the desert.



141. Ali Mehemet, 30 years old—Jaffaru.



142. Hamide, 40 years old—Jaffaru.

The front of the rabat faces south; on the open level yard before it lie a number of camels ruminating beside the heaps of bales; in the open niches the caravan men sit smoking and enjoying the sunshine so rare in these days. Behind each niche is a square room, where not a ray of sun can penetrate, and where coolness prevails in summer. On the roof are seen two *badgir* or ventilators, which cause a circulation of air.

The *seraiban* or host, the overseer of the caravanserai, supplies travellers with straw, cottonseed, bread, and dates; but he exacts high prices, for everything is brought from Tebbes, where it is a dear season. The serai is, then, permanently inhabited, and the host does a good business. He reckoned that on an average five hundred caravans passed the place in the year, and the number was certainly not exaggerated; four caravans were now resting here besides our own. Two great routes cross at Rabat-gur. One is our road, from Khur to Tebbes and on to Turshiz; the other is the great royal road between Yezd and Meshed, of which we had already passed two of the western short cuts. The great pilgrimage and trade route to Meshed does not then touch Tebbes, and the oasis is deprived of the revenue a lively caravan traffic always brings with it. From Meshed the caravans transport wheat, barley, currants (*kishmish*), figs, crystallized sugar, loaf sugar, Russian cloth, etc.; from Yezd in the opposite direction, Indian tea, spices, henna, lemons, English cloth, cotton, indigo, sugar, etc.

The road between Yezd and Meshed is divided into 28 *mensil* or stages, and to these must be added several days of rest, so that the whole journey takes about thirty-five days. Every camel costs 5 tuman for fodder, but yields its owner 11 tuman in hire, so that there is a profit of 6 tuman per camel for the whole journey. Caravans travel only at night and encamp early in the morning, when the camels are turned loose on the steppe to shift for themselves. Just before sunset they are driven in to get their only meal in the day of straw and *pambedaneh* or cottonseed. One of the caravans now resting contained thirty-six camels, of which a few carried straw and

the rest tea, henna, and cloth. It had left Yezd fifteen days before, and the leader had made the journey fifty times; he had done nothing else all his life, and had never travelled along any other road. The thirty-six camels were from Turshiz, and had cost on an average 50 tuman apiece; most were *luk* or geldings, a few mares, but not one a *nehr* or stallion. As usual, I noted down all the names on the road, not one of which is to be found on Stieler's map, but they all refer to springs, wells, and small insignificant hamlets. Tebbes is left at two days' journey to the east, and Turshiz a day's journey in the same direction.

Beside Rabat-gur stand two small huts half underground, where two bakers dwell; they have their bakery under the half-vaulted front, where they were actively engaged in baking delicious-smelling wheaten bread.

Rabat-i-gur, also called Rabat-gur and Rabat-guru, draws its drinking-water from a hauz, which was now full of fresh water; if it fails one has to be content with the salt stream from a spring in the vicinity. The reservoir which was built at the same time as the caravanserai is a long basin under a stone tunnel; a furrow from the hills conducts the water, and is regulated by low flanking banks, so as to enlarge the catchment basin. When one sees the result, a solid mass of water, which had in the morning a temperature of 45.7°, and was sweet and pleasant, one cannot help again admiring the ingenious arrangement which the Persians have learnt direct from Nature; for many natural *sengab* and *abambar* are to be found at the foot of these hills, though they evaporate away more rapidly than the artificial, and are often situated in places where they are not wanted.

We had pitched our tents near the reservoir, but I spent most of the evening at the caravanserai rising proudly and majestically on its terrace, a challenge to and a defence against the dismal desert around. I never tired of looking at the immense flat expanse of the earth's surface which stretched out eastwards. In the Kevir a remote horizon had circumscribed its circle around us, but there the country was as level as a frozen sea, and every-

143. The Village Jaffaru.

144. Court of a Serai in Chahrdeh.

thing was grey and gloomy. Here, on the other hand, the spectator was on an elevated spot with the immense depression below him, and here the sky was pure and blue, and the ground was of light, delicate, rosy tints. The whole length of Kuh-i-shuturi or "Camel Hill" beyond Tebbes shone with a faint purple shade at sunset, and even the snowfield on its crest was pink and formed a fine light outline against the blue sky behind. But the sun sank, the shadows from the western heights passed quickly over the desert and crept up the precipices of the Camel Hill, the purple hues grew dull and changed into a neutral grey, the outline of the range became indistinct, and the details of its relief, even before scarcely perceptible, vanished altogether, and rosy shades hovered on a thin veil of clouds high above the snow—a reflexion of the red light of evening.

The hurrying shades of night have stretched their dark curtain over the earth. Then is heard a wonderfully bewitching music from the inner court of the caravanserai, also surrounded by recesses with pointed arches. Two caravans are making ready for the night's march. The camels are brought forward in long rows to receive their loads. All the bells ring and their beats meet together in a single sonorous peal, strengthened by the echo from the solid stone walls and vaulted roofs, and the whole serai seems to be converted into sounding bronze and a vibrating resonator. How charming is the scene, how soothing and lulling the music, accompanied by the shouts of the men to the camels, and their talk as they hoist the loads on to the bearers! There is something grand and imposing in caravan life in Persia, the long wanderings through desert tracts, the longed-for rest at rabats. At Rabat-gur we felt that we were at a great focus of caravan life. Twenty years ago I had witnessed many such scenes on the royal road from Teheran through Ispahan and Shiraz to Bushir, and on the road through Khorasan, and I had even been a member of a large Arabian caravan from Bagdad, poor as a student and without a servant; now I travelled as a gentleman, had my own caravan, and could go whither I chose.

The travellers were a long time getting ready, and I withdrew to my tent. In the outer court a dog was gnawing and tearing at the ears of a dead ass—it was his evening meal before his night journey.

At nine o'clock all was in order. Then the dog began to bark, shouts and talking were heard, and the bells began to ring in earnest, much as when an orchestra starts to play. The large bells ding heavily and slowly, smaller bells chime in, innumerable small tinklers give forth a metallic sound, and the whole loud carillon moves off on the way to Meshed. The leading bells have jingled past our tents long before the last camels have left the court of the serai. The long train is only heard and is quite invisible, for now it is dark, and the only light is that of the stars. In two places in the train merry singers are heard, but they are drowned by the clang of the bells, which also dies away in the distance on the road to Imam Riza's tomb, worn for centuries by pilgrims and caravans. And we are enveloped in the perfect calm of another night.

145. A Trade Caravan ready to set out from Rabat-gur.

CHAPTER XXXVII

THE OASIS OF TEBBES

A CARAVAN from Tebbes came up jingling in the morning, completing its mensil just as we were beginning ours. The morning was fine and clear after a slight frost in the night, but the westerly wind still blew piercingly cold. However, it ceased after an hour of march, and when we had the sun right in our faces and the main furrow we followed sloped to the basin in the lowlands, we had a premonition that we were really approaching a *germsir* or warm country. We travelled eastwards among small spurs and mounds, the road was excellent, and the camels marched with ease. In one place there seemed to be a tendency to the formation of kevir, where the ground was now dry, but deep holes and the marks of the slipping foot-pads of camels showed that here, too, the ground was smooth and treacherous after rain. A large pond still stood in a hollow where the camels drank. In a broad defile between low hills the main bed has cut out a channel in solid rock to a depth of 6 feet and 65 to 100 feet broad. At Chil-i-Shah-Abbas, a votive-cairn, the road runs for a time down in the furrow, the bottom of which is full of pebbles and coarse sand. At Moghu, where a solitary palm has gone astray, the country flattens out in earnest, and all the furrows become more indefinite and shallower. At the right stand the western spurs of the hills and small projections, such as terraces, vanishing away towards the low land. The rock was compact limestone, sometimes dark brown and sometimes light red or greyish, and in one place I found a fine fossil shell.

Our course makes straight for the highest part of Kuh-i-shuturi, which now lies in shade and assumes the aspect of a steely-grey wall, but as the sun mounts higher its colour becomes warmer and its structure comes into view again. At eleven o'clock the sun feels burning hot, and light breezes from the east-south-east are refreshing. Due east a faint strip is seen—the palms at the village Chahrdeh, the end of our day's march.

Hauz-i-seh-farsakh is a covered cistern with water from the last rain, but after that the furrows become shallow and less marked; they run south-eastwards. Dreary and lifeless is the country; the pebbles become fewer, and the shrubs grow singly, often raised on small hillocks of earth. Three men are driving four asses laden with clover towards Rabat-gur. The fall ceases, and we are now down on the bottom of the depression; at a sand-dune the absolute height was found to be only 2169 feet, so that we were 980 feet lower than at Rabat-gur. Bokend-i-gau is a grotto in a terrace by the road, and here starts a large flat furrow into the white ground in the south to which all the furrows now run. We have, then, kevir ground on our right, and *biaban* or ordinary desert on our left, these two forms which are so diverse, life of any kind being completely absent from the Kevir, while tamarisks, saxaul, shrubs, and water are to be found in *biaban*.

Hauz-i-yek-farsakh, that is the hauz at a farsakh from Chahrdeh, stands dry in this vast waste, and is so remote from all hills that it is probably very seldom filled with water. The distance to the small kevir on our right seems to be only half a farsakh; its white surface quivering in the dazzling light looks like water, and a row of black spots above it are said to be tamarisks on the shore. It seems that there is also a salt swamp called Darya-Suleimani. Kuh-i-shuturi is fainter than yesterday, but we are lower down, and we have to look through denser and less pure air than up at Rabat-gur.

The hours glide by, and we draw near to our goal, and Chahrdeh's dark row of palms becomes more distinct. The ground is now quite level and absolutely barren, and consists of yellow clay. We leave on the

146. The Village Chahrdeh.

right a path leading to the village Kheirabad, half a farsakh from Chahrdeh, and in the same direction is seen a grove of seven palms. A *gez*, a kind of tamarisk, grows by the road, more like a tree than a bush, and of a beautiful cypress-green colour. Two ruins stand by the road, a fallen-in kanat and two others which are still in use, and finally we come to green fields with majestic palms rising above them, some higher than the others by the crown. The road takes us along the wall of the quadrangular fort with towers at the corners and at the middle of the northern and southern sides, and surrounded by a moat. It has suffered much by time, and many heavy downpours of rain have eaten deep vertical grooves into its ramparts. We ride past the burial-ground, where the abodes of the dead are covered with bricks, and where some decayed mortuary chapels have been erected over the graves of prominent men.

In the open square, outside a magnificent caravanserai built twenty-five years ago by Haji Mollah Taghi of Yezd, we set up our tents. The roof of this quadrangular hostelry affords ample room for walking beside the brick-covered cupolas, and from here a picturesque and instructive view presents itself. The western hills form only a dark outline beneath the sun, and after it has set an intense yellow glow shines above the dark crests. Kuh-i-shuturi is nearer and therefore shows a stronger purple tone than yesterday, the snowfields shimmer more intensely white, and the whole presents a fascinating picture peeping out from between dark palms. With their verdure the grey houses of the village lying below us are in striking contrast. Graceful, elegant, and flexible as reeds the palms lift their heads, some straight and stiff, others bending slightly and humbly, but always standing out clearly with their deep green colour against the light airy tints of the horizon. Here and there yellow leaves, damaged by the frost, are distinguished in their fine fronds. A hundred of the thousand palms of the oasis perished in the last severe cold.

Wheat also and barley, cotton, and tobacco are grown, and the village has 3000 sheep and 30 asses. The houses are 80 in number and are inhabited by 1000 persons, a

number which seems too large. The name Chahrdeh or Chahr-deh-i-Tebbes, "the four villages near Tebbes," refers to the group of villages lying round Chahrdeh proper; Mehdiabad, Turgeinun, Suleimanieh, Teshkanun, Kheirabad, Kasimabad, Deheneh, Tajiabad, Dovletabad, and Deh-shur. A hill 4 farsakh off to the north-east is named Kuh-esmeigu. A small number of wells exist in the desert around—the haunt of wild goats and gazelles.

We were told that there was great heat for forty days and winter for sixty days. It had snowed twice in the winter and rained ten times, and the precipitation, as in other districts we had passed through, had been more abundant than usual. The prevailing wind comes from the north-east, the bad-i-Khorasan.

Darkness has scarcely fallen before jackals begin to bark and howl in the desert. We can hear that they are hunting in packs, but they do not venture near the tents where the dogs are keeping watch.

The inhabitants of Chahrdeh took no notice of us when we commenced the last day's journey on our way to Tebbes on the morning of February 27. Teshkanun stands at a little distance to the right and then the road runs close past the villages Tajiabad and Turgeinun, so that their palm groves stand on the right and their water-logged wheat-fields on the left. Two small ass caravans, laden with firewood, come from the steppe at the edge of the nearest kevir. A wheel track in the dust of the road has been left by the governor Emad-ul-mulk, who has returned by a roundabout way from an official journey to Tun, for this town also is under his administration, and his district is therefore called Tun-ve-Tebbes. Villages and their palms stand out in sharp outlines against the pale hills on the horizon. All the canals run south-west, like the erosion furrows, as, for instance, the open canal of Kerdabad, where two zebus are drinking, a first suggestion of India. The village is surrounded by a perfectly barren, pebbly plain, but the canal has conjured green fields and waving palms out of the waste.

A cool southerly breeze modifies the heat, but it is

147. Outside the Caravanserai in Chahrdeh.

evident that we have at last come to germsir; at one o'clock the temperature is 60.3°. After the second farsakh we cross a kanat, the course of which can be followed by the eye for a long distance to the south-west, and 110 mounds of earth round the mouths of the vertical shafts can be counted. It is a grand conduit in the lap of the desert, a tunnel, a subterranean corridor which is carried for a long distance to come up at Aliabad. The village itself is barely visible in the distance, and yet it hangs like a water-lily on its stalk at the extreme end of the canal, which at every shaft sinks a hair's-breadth with the natural fall of the detritus slope and finally emerges into open day to coax with its water green wheat-fields and rustling palms out of the desert.

The furrows are also, of course, directed to the south-west, and when we came to Chahrdeh this direction of fall had prevailed from the Kuh-i-shuturi range. In Chahrdeh the height was 2287 feet, and thence we mount very slowly up to Tebbes, which lies at a height of 2405 feet. Scattered shrubs grow in the furrows, but elsewhere the ground is barren and thinly strewn with pebbles. Another kanat runs to the village Mohamedabad, filling as it passes a hauz, with its vaulted cupola of mud partially fallen in. The dark line in front of us begins to change to green—it is the palms of Tebbes below the snow-clad humps of the Camel Hill.

Beyond an erosion furrow, 100 feet broad and 6 feet deep, the road between low hillocks assumes a more important appearance, the great highway to Tebbes. And yet there is no traffic to speak of, for we meet only a few asses sleepily and reluctantly responding to the objurgations of their drivers. Perfect desert surrounds us, grey and yellow, and without a tuft of grass, but the great oasis will soon place a barrier against its further extension to the south-east, and to the dried and scorched domain of the powers of evil. And in the distance the friendly palms beckon to us and invite us to their pleasant cool shade, and to rest in green meadows. Nothing can be more charming than an oasis in the desert, and no oasis can be more beautiful than Tebbes.

There is no more breeze, and, exposed on my tall steed, I have to put up with the burning sunshine. This is germsir, the land of palms, quite a different region and another climate from that on the shores of the Kevir.

Atabek, the Grand Vizier, had provided me with a firman, a kind of letter of recommendation to the Governor of Tebbes and Tun, and Abbas Kuli Bek and Gulam Hussein were sent on in front to request the authorities, on the strength of this document, to place at our disposal a separate and comfortable garden. The two messengers quickened their steps, and soon disappeared as two dark specks in the grey country.

We followed at our usual pace, and were astonished to find the land so dreary in the neighbourhood of the great oasis. Only a small ass caravan came trotting along on its way to some outlying village, the countrymen returning after transacting their business in Tebbes.

The oasis is long, and stretched out parallel to the erosion furrows and irrigation canals, and therefore runs ENE. to WSW. We are coming from the north-west, and the visual angle between the extreme palms on either wing gradually increases. The dark green line is resolved into clumps and groves of palms, some tall, some short, some standing alone and some in close groups, and their crowns are like the winter locks on the foreheads of camels. Above them rise two cupolas and a minaret. Over the same waste land, perfect desert, we draw nearer, and one detail after another becomes visible. It turns out that the two cupolas are situated beside the road, a good way before the oasis, and there we halt a while, for the large camera must be taken out. They stand over the grave of the Sultan Hussein Riza. He was brother to Imam Riza, and his *imamsadeh* is finely situated on a small mound, where many of the inhabitants of Tebbes sleep in their graves on the south-eastern slope. Nevengk, who is in front, springs up the mound, and begins to howl piteously, perhaps displeased at the jackals which keep themselves hidden in their lurking-places in the desert, perhaps bewailing the slumbering guests whose fate has brought them to this small isolated town, more

148. The Great Tamarisk outside Tebbes.

149. Tebbes. The Snow-clad Kuh-i-shuturi in the distance.

remote and cut off from the restlessness and turmoil of the world than most other towns in Asia.

This singular town now lies before us with its castle, its walls, and its towers, and the tall minaret rising like a beacon above the whole. Not a living soul can be seen, not an idler or a traveller, and it seems as though the great highway led to a slumbering town. To the left of the road stands a tamarisk with two trunks, the largest of the kind I have ever seen, majestically grand, and defying the desert alone, close and compact in its mantle of dark-green foliage, a blessed tree, which affords cool shade in summer to those who come out of the desert and would rest a moment to look from its refreshing vault at Tebbes, and the snowfield of the Camel hill in front. We, too, rested here, for the tamarisk was worth a couple of photographic plates. Seen through its boughs and stems, the town has a quaint appearance as of a desert mirage, a dream-picture which has sprung up under the wand of a magician out of the niggard ground.

The last bit of road remains to be traversed. We ride straight towards the round towers on the outer wall, and see the towers of the citadel within. The desert stretches right up to the wall, and not a tuft of grass grows without the bounds of the oasis. Four horsemen come spurring towards us on half-wild, well-groomed, and richly decorated horses, with saddle-cloths and costly saddle trappings. They dismount and salute respectfully, and the principal brings me a greeting from the Governor, bidding me welcome to his residential town, and asking me to accept the garden he has put at our disposal. One of the fine horses is offered for my use, but no outward pomp and state and no solemn entry into the town can induce me to neglect my map. I therefore remain on my quiet camel, where I have both hands free and a more extensive view.

With these horsemen as heralds we turn round the northern bend of the wall and enter an outer street, where cotton is being cleaned and linen dyed dark blue in open booths and shops. Long webs hang across the street as if it were decorated with flags to celebrate our tinkling

entry into this desert town. On the right the wall with its round towers and its moat forms a picturesque background.

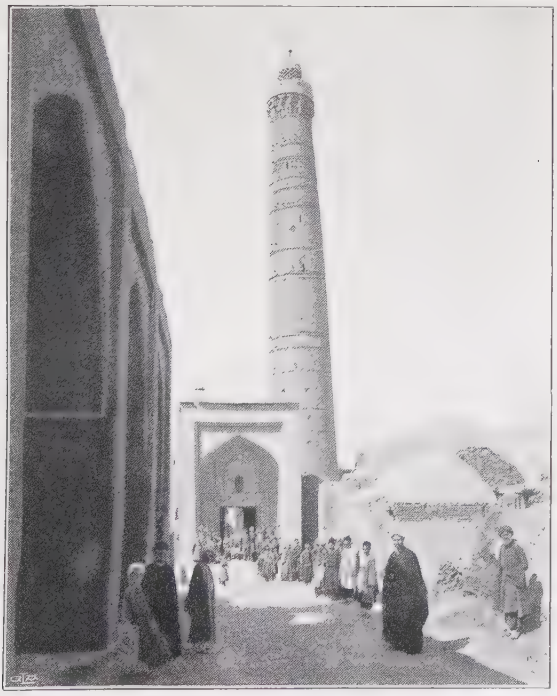
Now we turn to the left and come out into the meidan of Tebbes, where there is plenty of life. Here goods are bargained for and sold at open stands, there, where the caravans encamp, is a constant coming and going, some of these arriving from neighbouring villages and others loading up to set out from the town. Crowds of inquisitive people flock round us and follow in our train; there is no need to be told that the arrival of a European in Tebbes is not an everyday occurrence.

A tremendously long straight street, rising very gently towards N. 67° E., enters the meidan; canals flow on both sides supplying moisture to rows of mulberry trees, weeping willows, and oranges, the latter growing up out of protecting guards of clay. Some of the houses are quite elegant for Persia. The entrance to the Governor's palace is seen on the left. We at once conceive that the town really consists only of this main street, for the quarters on either side, the gardens and the palm groves, are quite narrow. Through the latter run passages and cross lanes, at the bottom of which are seen the open fields with the desert behind.

At last we come to the end, a small square with the façade of a half-ruined house, and through its portal we enter the peaceful garden which is to be our home during the following days. But the gateway is too low for our tall camels, which therefore remain in the square and the baggage is carried in. My tent is pitched on a lawn between two canals rippling pleasantly in this scantily watered land, where the murmur of running brooks is the most delightful music. It is an advantage to be surrounded by water, for then one is pretty safe from scorpions; and, living on the uppermost edge of the oasis, we have the satisfaction of knowing that we are the first to make use of the canal, which becomes more polluted the farther it descends.

The tent is so placed that the shadow of the surrounding palms makes it fresh all the day long. It seems that one cannot stroll with impunity under the

150. Tebbes. In the centre the Great Mosque and the Minaret.



151. The Street leading to the Mosque.

palms, but I have longed to rest in their enclosure and listen to the rustling in their crowns. To the north-east the snowfields of Kuh-i-shuturi shine through the dark green polished palm leaves, and far away on the right extremity is seen the spur of Kuh-i-jemal, while the western skirting hills of the basin are quite invisible in the present light and at such a great distance.

Above the gate on the front of the garden is a *balakhaneh*, and from its windows and doors one can command the whole horizon. Here we are at the upper end of the long street which runs like a yellow narrowing riband between the dark groves, and exactly along it now glows the setting sun.

The canals of the garden converge into two channels, each of which waters a side of the oasis; side branches are given off from both to the fields and gardens, and the system is so arranged that various areas are irrigated in turn. Now the whole supply of one canal was conducted to the highest field, which in a short time was under water; then the water is led into the next field, and so on, down to the lowest margin of Tebbes.

Some men in black lambskin caps, dark roomy coats, wide trousers and slippers, enter the garden in festal procession, each bearing a vessel, and place before my tent two loaves of sugar, a bowl of honey, bowls and jugs of sweet and sour milk, dates, roghan, and bread—this is the Governor's *dastarkhan* or gift of welcome. The evening wind is cool after the warm day, and the brazier is acceptable. The singing-birds which twittered in the palms are silent and seek their nests. The jackals start a melancholy serenade, and one has only to commence his long-drawn-out dismal laugh to start a thousand others, and so the soft, plaintive song of the desert vibrates through the night. The canals murmur pleasantly, overpowering the voices from the men's tent. The sky is perfectly clear, and the stars shine with great brilliance. The palms stand out in dark outline, spreading their dark fingers like emblems of peace over our tents, and their hard parchment-like leaves rustle and rattle as the desert wind whistles through them.

We stayed a week in Tebbes, and the days were spent as follows. On February 28 I went to visit the Governor, Emad-ul-Mulk, and was first received by his son, a young man of twenty, who conducted me through a court, where servants and ferrashes were posted in long ranks, to the palace, where we took our seats on proper European chairs before a fire and by a large open window, or door it may perhaps be called. The floor was laid with carpets—here people walk in stockinged feet—and all kinds of delicacies were served on a table. Out in the courtyard the sunshine stole through the branches of leafless fruit trees.

Then the Governor came in, a small man of thirty-eight years, with black moustaches, and kindly bade me welcome to his town and his house. In a short time we were like old acquaintances, and Emad-ul-Mulk told me that he was born in Tebbes, where his forefathers had held the same title and office as himself for 200 years. He stated that his ancestor, Emir Hassan Khan, had conjured the present Tebbes out of the ground 120 years ago, for before then the oasis lay farther north, but at the present site the soil was considered better. Palm gardens were planted; irrigation works set in order; the khiaban or long avenue and the meidan were marked out; the bazaar, the lower half of which is now in ruins, was built; the Meshid-i-Juma or Friday Mosque was erected; and also the fortress (*ark*) as a defence against the Baluchis. But, again, it was said that the lofty minaret, visible from far around, which is generally called *minarek*, was 900 years old, and was built by an Emir Leis Seffar Sistani, a statement which implies that there was, long ago, an oasis on the site of the present Tebbes. The minaret stands beside the large mosque, but is not used for the call to prayers, the muezzin summoning the faithful to worship from the *pishtak* of the mosque.

Emad-ul-Mulk—and he if any one should know something about it, for he seems, like his fathers, to own almost all the oasis—assured me that the oasis, together with its surrounding villages, contains 2000 houses and 10,000 inhabitants, who pay 40,000 tuman as *maliat* or tax

152. The Governor's Palace in Tebbes.

to the Crown. And the number of villages, as I learned by noting down their names, is 79, the Chahrdeh villages included, besides some which lie as far as 20 farsakh from Tebbes. Each has its own kanat, and seldom have two one in common, for the quantity of water in the kanats is so small that it will not suffice for more than one village. Tebbes itself has no underground kanat, but the oasis is watered naturally by a stream fed by springs which lie in the hills north-north-east at Teng-i-Tebbes. This stream never fails in summer; it would rise until about the middle of April and then become smaller during the warm season in consequence of evaporation. In the highest part of the oasis, just above our tents in the garden, the brook empties itself into a walled basin, where the water stands and clears, and then in two small waterfalls passes on to the two canals.

The elegant front of the governor's palace faces a garden, and its *eivan* or open hall is closed with a curtain which is only partly drawn up.

At the sides kiosks and bay windows are built into the wall. The walls in the large hall are covered with mirrors in the genuine Persian style of decoration; there are, besides, many smaller apartments, and before the front is a large walled-in basin. The garden is crossed by straight walks, and here, too, a basin is sunk in the ground, and fine palms and oranges are reflected in its surface.

In Tebbes are cultivated dates, figs, grapes, apricots, and peaches, melons, red and white beet, onions and cabbages, spinach, cucumbers, aniseed, gourds, etc., as well as wheat, barley, and millet, and, lastly, tobacco in considerable quantity. The palms constitute the wealth of Tebbes, and the water-supply is insufficient for much else, and the cultivated land is so restricted that it cannot support the population of the oasis. The wheat-crop yields only enough for eight months' consumption, and for the other third of the year the people are dependent on the imports from Turshiz and Sebsevar. For the cultivation of rice the water is no use at all.

The winter is considered to last four months in Tebbes, December to March, and the summer five,

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May to September: the others are transitional months, spring and autumn. During the fearful heat the people live in an inactive and stupefied condition, and spend all the day in a *serdab* or underground room with or without spring water, down to which a badgir conducts any small draught of wind which may pass over the roof. As soon as the sun has set they creep up again to the surface, and spend the evening and night on the housetops, where some freshness is to be found. The town in summer is lifeless, caravans seldom come to Tebbes, and business in the bazaar languishes. We therefore visited Tebbes during the best season, and it was still considered to be winter, though the temperature in the afternoon rose sometimes to 68°.

In the warm season especially one has to be on one's guard against three poisonous reptiles, which contribute to render life miserable to the dwellers in the beautiful oasis. A poisonous and dangerous snake houses in the old walls; and scorpions, both black and yellow, are found in every house in Tebbes. It is difficult to find an inhabitant who has not been stung once or oftener by scorpions. Then there is a large, swift-footed hairy spider, probably a kind of phalanger, which is said to give a very severe and painful bite. It lives out in the desert, especially on sandy ground and on the boundary of the Kevir. Its curiosity is roused by light, and when men camp in the desert it makes for the camp fire. If they abstain from lighting a fire they may be sure of coming off scot-free. It is said not to strike for defence or out of maliciousness; but if a man passes the night in a lighted tent the spider may creep up inside the tent canvas and fall down on any one sitting or lying below, and to get a fresh hold it strikes its mandibles into any object it meets with, and if that chances to be a man's hand, the blood is inflamed by the poison. The people in Tebbes assured me that if a man kills a female, her mate gives himself no rest till he has exacted vengeance. He will follow the murderer even for 3 farsakh, and is as swift-footed as a galloping horse. He does not run like an ordinary spider, but leaps forward in

154. A Near View of the Minaret.

hops. He never loses sight of the murderer's track, and watches for a suitable opportunity to deal his blow of revenge. Farther east, and in Baluchistan, still more monstrous stories are told of the tarantula's watchfulness and vindictiveness.

CHAPTER XXXVIII

A PASSION-PLAY IN MOHARREM

MARCH 1. After a temperature of 37.9° in the night the morning is warm, but a strong north-north-east wind cools the air and mitigates the heat of the sun. With two of my men and two of the Governor's ferrashes to keep too inquisitive persons at a distance, I go out along the *khiaban*, the long avenue; it takes us nineteen minutes to pass through it, and according to the inhabitants of Tebbes it is 3000 paces long. Then we cross the meidan and make for the gate in the wall which encloses the bazaar town, and through which we come into the bazaar's tunnelled street situated in the prolongation of the avenue. This tunnel is 325 paces long, and at its farther end we turn at right angles to the left up to the fortress (*ark*), the gate of which is now closed. If one walks straight on in a line with the bazaar one comes to the front of the Meshid-i-Juma, the principal mosque of Tebbes. There also stands the old minaret with its elegant Kufic inscriptions; it is built of burnt bricks, leans a little, and is about 130 feet high. In consequence of a new crack in the spiral staircase it is quite impossible to ascend to the top of the tower, where the view of the flat oasis must be fine. Near at hand is a *medresseh* or theological high school, with two old minarets, low but really handsome. As I always carried with me my large camera on my walks and made use of it, I was surrounded by a mob of boys and idlers, which gradually increased and could not always easily be kept at a proper distance. But by degrees the Tebbes folk became accustomed to see me in the streets and market-place, and at last left me in peace.

155. A Clump of Palms in our Garden.

156. Palms in the Tekkieh-Court.

157. The Western Gate of Tebbes.

In my book *Trans-Himalaya* I have related how a lucky chance brought me just in time to see the greatest annual holiday of the Tibetans, the New Year's festival, which was celebrated in Tashi-lunpo two days after my arrival at Shigatse. But before that I had the same good fortune in Tebbes, which I reached two days before the greatest annual festival of the Shiites in the first month of the Mohammedan lunar year, Moharrem. The first ten days in this month, which in the year 1906 fell in March, are consecrated to the sorrowful memory of Hussein's martyrdom at Kerbela. He was the second son of the fourth Khalif, Ali, and in the struggle with Yezid and the Ommeyads lost both the battle and his life on the 10th of Moharrem, 680. The day is named Ashura, and no other day in the year calls forth to such a degree the religious enthusiasm and fanaticism of the Shiites. In all the towns of Persia the anniversary is celebrated with song and plays, with loud wailing and tears. The holy martyr's death and the defeat of the followers of Ali are bewailed, their bravery extolled, and the victorious fiend Yezid and his troops are overwhelmed with abuse. All the most popular events in the religious history of the Shiites are represented on the stage by more or less capable actors. The soldiers of the various armies appear in full harness, whole caravans exhibit their baggage and camps, a mollah intones the narrative of the fate of the family of Ali, and troops of fanatical volunteers go about the circus-like arena bawling and howling, "Ya Hussein, ya Hussein." Its name is *tekkieh*, and such a show-ground is to be found in every Persian town, in the larger towns several of them; even in such an insignificant place as Chahrdeh there is a *tekkieh*. But the passion-play itself is called *taziyah*.

It was to the tekkieh of Tebbes we now betook ourselves, after making a hurried inspection of the architectural beauties of the small town.

We enter an octagonal court where the play has just commenced. In the middle is a basin. The ground is paved with stone flags, and here and there in the pavement is a gap where a palm raises its noble trunk into the air. On the north and south *pishtaks*, façades with open vaulting

and portals, face the court. In front of the façade on the north side is a large tent with its edges and folds stretched out by ropes. Here sits a mollah and reads the legend of the passion in a loud, clear, sonorous voice.

As a *kafir* or unbeliever I could not go too near. My friend, the Governor, who fulfilled all my wishes with the greatest amiability, had at first expressed some anxiety with regard to my presence at the play. He could not answer for his countrymen's self-control, and for their outbursts of fanaticism. Their fury against the enemies of religion might find in me a convenient object of attack. But to obviate all unpleasant incidents and to secure my complete safety he surrounded me with a needlessly strong guard, which took up its position in a vaulted recess where I stood with my camera, and partly on the stone pavement before it, above which the floor of the recess was raised about 3 feet.

The court swarmed with spectators, but I had a good view over their heads of what was going on, though I missed some details. The actual play was performed on a raised platform in the tent, and the distance was so great and the shadow inside so dark that I could only distinguish the gaudily dressed actors who represented Hussein and Yezid and their men, and hear how they wrangled with one another. At any rate, they reproduced part of the tragic story, which has been related so many times already that I need not recapitulate its changing scenes and phases.

The part of the play which represented the concentration of the troops at Kerbela, the march of the armies to the field of battle, and the passage of the baggage caravans through the desert, were seen much better, because the men and animals, who took part in them, were not drawn up in the tent but wandered about round the basin and therefore passed just in front of our "box." There marched real caravans of camels, the finest and tallest animals that could be obtained, elegantly decorated with cloths and finery, red rosettes, ribands and tags, bells and rattles, and whole rows of boys sitting on them. Then came trotting mules carrying *kajeveh* or wooden cages covered with red and blue cloth. In such pairs of panniers women ride, but

159. Boys in Tebbes.

160. A Tekkieh or Religious Theatre in Teheran.
Photograph taken by an Armenian in Teheran.

only men and youths appear in religious plays, and the latter take the female parts dressed in correct costumes. Again we have *iliat* boys of nomad tribes riding on mules, which are also loaded with tents, poles, and household utensils of various kinds; *kalianchis* with water-pipes in the holsters in front of the saddle and other articles hanging down round the stirrups; horsemen in cuirasses with helmet and sword, and soldiers in ancient costumes with lances, flags, and spears with pennants attached. The performance is interesting, and is an unexpectedly brilliant scene. It is astonishing to find such great resources in this small oasis in the heart of the desert. The well-kept garden, the white tent roof, the silent palms, the motley dresses, the life and movement, the animals, all was exceedingly attractive and full of colour.

When I took my place in the niche, the people streamed across towards me and stood close as a shoal of herrings, watching my incomprehensible manipulations of the camera, the stand, and the black cloth. But after a while the priests, dignified and solemn in their white turbans and long kaftans, thought that this had gone on too long, and that it was shameful that an unbeliever should attract greater attention than themselves, and therefore gave orders to the police to drive them over to the other side of the court where the mollah was intoning the legends. Then ferrashes came forward and drove the crowd with switches and silver-studded batons across the court. A boy climbed as actively as a monkey up a high, straight palm trunk to pluck a withered leaf from its crown, and made himself a switch of its hard stem, wherewith he helped the police to dust the jackets of the mob.

On the flat roofs around the arena women sit wrapped up in their veils, and chattering and croaking like jackdaws. Those of higher rank have a white veil before the face with openings for the eyes, just as in the larger towns, but the poorer women have blue veils or rather sack-like wraps which cover the whole head and body. Tebbes is noted for its fanatical Shiitism, and the custom of veiling is also very strictly observed. It is seldom that one catches a glance from a pair of black eyes, but many small girls who

have not yet taken to the veil give promise of being beautiful some day, and their features speak of handsome mothers.

On our return home we cross the meidan again, and I watch for an opportunity of taking a view or two. It is certainly smaller than the King's Square in Teheran or Ispahan, and has an exceedingly trifling business compared with that which enlivens the centres of the larger towns; but still the market-place of Tebbes can pride itself on its genuine Oriental character, where not a breath of European influence and not a sign of foreign merchandise disturbs the perfectly uncontaminated sanctity of an oasis which is far removed from the clutches of Christian strangers. Certainly Russian and English cloth, groceries, petroleum, and stearin candles are to be found in the bazaars; and in the houses of the townspeople even chairs, tables, and porcelain lamps which hail from Western lands; but what is this compared with Teheran, where Greeks, Armenians, and other vagabonds do their dirty work, and the Oriental, careless and supine, sleeps and dreams under the influence of the foreign narcotic? No, the meidan of Tebbes is genuine, hither not a single echo of the tumult of the world penetrates, here it is pleasant to stand and watch the life, the potters' and fruit-sellers' booths, and the mats where hardware dealers sit sharpening and selling their knives. And above and without the market's frame of yellow mud houses and shops with projecting roofs of poles and wickerwork an evergreen ring of palms waves in the wind.

In the afternoon Emad-ul-Mulk came to return my visit, accompanied by a large party of gentlemen in attendance, among them a venerable Seid in a green turban, spectacles, and a snow-white beard, and the postmaster of Tebbes. They came trooping into the garden in a slow and solemn procession, so quietly and silently that it might have been a funeral cortège but for the absence of a coffin. As many as could find room were invited into the tent, and for the rest there was space enough on the grass outside. The Governor gave me a pitcher filled with dates, from which the stones had been removed and a quarter of a shelled walnut put in

161. The Tent in the Tekkieh-Court at Tebbes.

162. The Market-Place of Tebbes.

163. A Shoemaker in the Market.

the place of each; the whole mass was cemented together with sugar, and formed the most delicious sweetmeat I have ever tasted.

My table overflows with milk and honey, in a literal sense; we live like princes, and might imagine we were translated to Muhamed's paradise—but without the houris, for the dark blue apparitions who skim about the streets are forbidden entrance to our garden. We are tabu, inaccessible to all eyes. The mud walls are too high, but yet so far away from the tent that I can enjoy the sunset every evening and see the pink Camel Hill change to a cold bluish-grey outline; it seems as if the dream-pictures, gilded by the light of day, gave place to more sober reality. But when the moon's sickle sheds a glittering sheen on the waving crown of an old palm tree, the dream-pictures come to life again, and I muse on the loneliness of the desert and rest in verdant oases.

It still blows hard from north-north-east, the atmosphere is not quite clear, the palm fronds rustle and creak, the same restless and yet soothing sound I remember in Khotan in 1896 and in Charkhlik in 1901, an evening hymn I never weary of. We have no reason to complain of heat; it is 36.7° at nine o'clock, and my mangal has often to be filled with glowing charcoal.

I spent a couple of hours in developing the plates I had taken during the day, and a little cabin beside the portal was converted into an excellent dark room, in which, however, I was not quite safe from scorpions. It was in the depth of night that I sought my bed and listened a while to the murmur of the canal barely 3 feet from my pillow, and the dying breeze whispering in the crowns of the trees. How different from the sound of the water trickling from our sheepskin sacks and the howling of the wind among stones and dry shrubs in the desert!

Suddenly both our dogs rushed barking up to the dam. A howl of pain disturbed the night. It was a jackal which had ventured too near and got a pinch. Their plaintive serenade had as usual been hushed after dark; for when they have signalled to one another they are

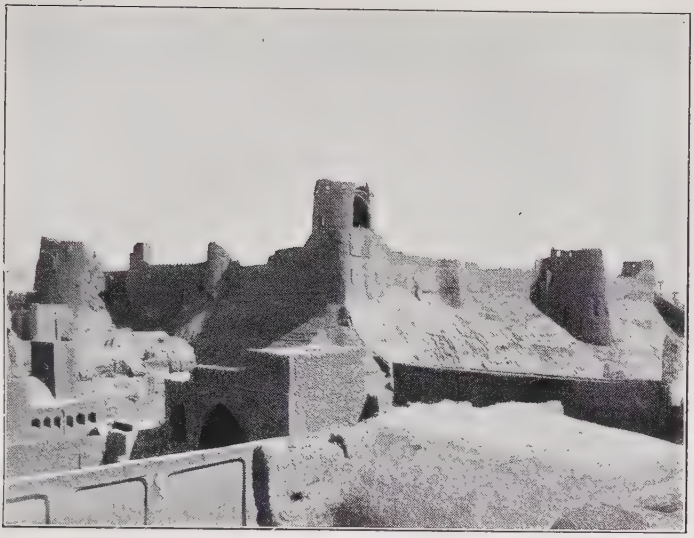
silent as they prowl about the town, its streets, and gardens.

Next day the air had cleared and there was no wind. The hill, therefore, stood out clear and distinct, and the massive at the foot of which Naibend lies was plainly visible. I made daily excursions in the town to draw and photograph, and a faithful troop of inquisitive people attended me, from whom I selected my types. We made another visit to the fortress. When newly erected it must have been an imposing object, but it was badly built from the first and of poor material, and therefore it is already in ruins, and one has to scramble over heaps of fallen masonry in the corridors and passages to reach the castle yards with their usual pishtaks or portals. In one of these courts grow a few palms, well sheltered from wind and weather. From time to time we heard the mournful cry, "Ya Hussein, ya Hussein," from the tekkieh, but we did not visit it, for the plays during the ten days are very similar, and every day the lamentable death of Hussein on the plains outside Kerbela comes a little nearer.

A nightingale lives in my garden, and sits every evening and night in one of the nearest palms, charming my ear with its song. It is the *bulbul* so frequently sung of by Persian minstrels, and the howl of the jackals presents a striking contrast to its melody. My bulbul seems to consider that it is its duty to keep me company, for when I return from my avocations in the dark room it is always in one of the palms above my tent, singing unweariedly.

On March 3 I rode out again to Imamsadeh Sultan Hussein Riza, which I had only hurriedly inspected before. It stands so grandly on a mound outside the town far from its noise and frivolity, and has only the desert for its neighbour. But, like everything else in Persia, it speaks of decay and neglect. The Persians think that money can be better spent than in preserving the old monumental buildings.

This shrine consists of a long extended conglomeration in which two large and several small cupolas rise between



164. The Fort.

165. Imamsadeh Sultan Hussein Riza.

166. Imamsadeh Sultan Hussein Riza.

two outside pishtaks. The cupolas are flat, and one of them in particular exhibits very bold vaulting. The other has stair-like terraces below. Through the principal entrance, a long court is reached with fallen pishtaks, niches in the walls and a few palms, their bright green harmonizing well with the greyish yellow of the ruined walls. From this a long passage leads to a vaulted crypt, where some priests slumber in their graves amidst the gloom. Into the holiest of holies, where the saint's grave lies in complete tranquillity, a stranger cannot enter. Here the doors are locked.

I cannot resist pausing a while in the shade of the tall tamarisk, to listen to the mid-day breeze rustling through its crown of needles and enjoy the view of the singular desert town and the pink and snow-clad background of the Camel Hill. A similar tree stands near two small *gumbez* or towers. Tebbes was not the first place where we had seen one or two large old tamarisks standing peacefully outside, the outposts and heralds of the adjacent community.

Singularly enough, the temperature in the night had fallen to a minimum of 27°, and even at one o'clock it was only 46.8°, but as the air was calm it felt warm, and in the sun outside almost broiling hot. To me it was a surprise to find it so cool at the beginning of March in this part of Persia, the promised land of palms. I had expected subtropical heat at this time of year.

We returned to Tebbes through the western gate of the town, and rode up through the bazaar and the lanes leading to the tekkieh, for to-day also the play was performed as usual, and we stayed there a while. It was another chapter in the sad story, another step towards the catastrophe at Kerbela. A procession of men passed round the arena bearing a number of flags wrapped round their poles and enfolded in cloths, and then followed a group of about thirty men with their heads and the upper part of their bodies bare. They accentuated every step, and every time called out in a deep, almost frenzied voice, "Ya Hussein, ya Hussein," many of the spectators joining in. Together with the

step and shout they beat their right fists with all their strength against their left breasts, all together, so that a heavy solid vibration sounded out from their chests. They egg one another on, and unconsciously themselves, to a kind of fanatical transport, and the longer they march round the arena the more clouded their senses become, the deeper and harsher sound their voices, the harder they strike themselves on the breast, until at length it becomes red, swollen, and suffused with blood; they remind one of the howling dervishes in Constantinople.

There are certainly as many as 3000 people in the court, and on the roofs around some 340 women have taken their seats. *Sakkas* go about the court offering water to the crowds out of sacks they carry on their backs; they hold a cup in their hands, fill it with a turn of the hand and present it to the thirsty spectator gratis. The spectators themselves bring dried dates, which they munch from time to time.

Tebbes has two tekkieh. One is that of the mollahs or priests; it is more dignified and religiously orthodox, and is more confined to the recitation and intoning of sacred legends, without any *tamashah* or theatrical plays. The day is commenced at the mollahs' tekkieh and continued in ours, which belongs to the *hokumet* or government; that is, is under the supervision of Emad-ul-Mulk. Here the play begins at mid-day and lasts for four hours every day, and is especially arranged to satisfy the religious needs of the people. I had wished to set out again as soon as possible to avoid the great heat in Baluchistan, but my servants declared with one voice that it was unlucky to begin a journey during the ten days' celebration in Moharrem, and I was quite content to wait till they were over.

Then we went back to the silent peacefulness of our garden, but on the way looked in on two lanes on the north side of the *khiaban*. They were exceedingly picturesque and attractive, as may be seen from some of my photographs. In the middle, small bridges span a tiny canal which waters the roots of mulberry trees and willows, which, now stripped of leaves, throw a pleasant

167. A Group at Sunset.

168. Picturesque Street Scene in Tebbes.

green shade over the lanes in summer. At the sides stand grey walls and houses, with roofs usually crowned with mud cupolas. Above the walls rise stately palm trees, and their elegant regular forms look all the grander beside the disorderly confusion of branches in the knotty crooked trees. The picturesqueness of this Eastern urban scene is by no means marred by the living figures and some of my largest camels. They are quite in keeping with the picture, and indeed one can hardly imagine palms and oases without camels and dromedaries.

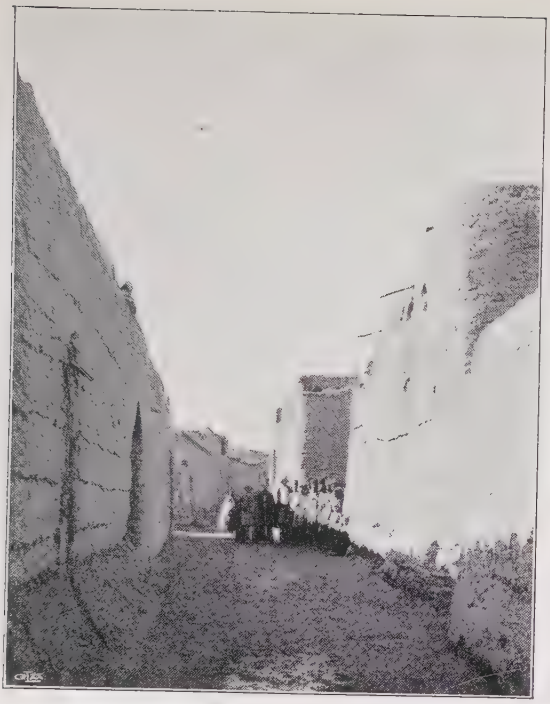
I have already mentioned an old white-bearded ecclesiastic who always showed himself in the Governor's company. We also made the acquaintance of another Seid, who did not announce to the world his descent from the prophet Mohamed by the usual green turban, but wore, instead, a green scarf round his waist. He insisted that this application of the holy green colour had quite the same validity as if worn on the head, but I suspect that his connection with the prophet was doubtful. All the same this gentleman, a tall man with a black kullah, a kind of frock coat, and a full beard, was extremely friendly and polite, and one day invited me to an entertainment. There was *sekenjebin*, a sour drink of grape juice which had stood fermenting for forty days and been then sweetened with sugar; *sherab*, a very innocent wine, which tastes more like sugared water; *chai* or ordinary tea, which is drunk in small glasses with a great deal of sugar, but without cream or lemon; *shirini* or sweets, spices in white sugar, and other kinds of Persian confectionery; and lastly *penir-i-khorma* or date cheese, which was the prime dish of the feast, and is made from the topmost pith of the palms out of which the long leaves grow. The juicy, white, tasty vegetable substance is considered a great delicacy in the land of palms, for to obtain the date cheese the whole palm tree must be sacrificed; it dies after the amputation, and therefore the operation is performed only on condemned trees, that is, such as stand in the way of building or are so closely packed as to spoil one another.

After the entertainment I had the honour of drawing

the portrait of the Seid's fourteen-year-old daughter, a small, dark-complexioned princess, with Jewish features and melancholy eyes, and a girl friend as well.

Another great favour was granted me in this house, namely, to visit the outer court of the harem, in the midst of which stands the usual basin provided with a stone slab where the fair ones wash their clothes. This court is secluded, and a notion of the architecture of the four walls enclosing it can be obtained from the two adjoining photographs. "Fair daughter of the East, what are the walls of the harem like, where thou, unique among a thousand, wanderest through the halls of Oda?" Here there were only twelve, who after much hesitation were coaxed out of their hiding-places, the holiest of holies in a Persian house, which no male individual may enter except the master, least of all a *ferengi*. They came out into the court with dragging steps, closely veiled, and with bent heads. But they could be heard tittering beneath the veils. They wore dark blue dresses, and stood motionless against the walls like a troop of nuns. Probably only four of them were legitimate wives, and the others attendants. Five of them carried babies. I was much amused at this strange situation, kept at a respectful distance and, as became a gentleman, did not exhibit any overt sign of curiosity.

I devoted March 5 to a thorough rest in my tent—it seemed as though Sunday lay over the country after a long and hard-working day. I awoke at seven o'clock when the temperature was 47.5°, and I was awakened by the rippling murmur of the canal and the morning song of birds in the palm crowns. Mirza brought in my breakfast: pillau of rice and chicken, two eggs, cucumbers, a bowl of sour milk, tea, fresh bread and candied dates. Some of our new friends came on a visit and sat talking to me an hour, and were thoroughly examined about the roads which converge to the oasis. At one o'clock it was 65.1°. I enjoyed the tepid air and the rising breeze, and lay reading Sykes's book, *Ten Thousand Miles in Persia*. Then I took some photographs in the garden, and developed them in the closet, the entrance of which



169. A Gloomy Street.

170. The Daughter of the Seid and her Playmate.

was closed with felt rugs and the light-proof burkha. Before nine o'clock a furious north wind blew over Tebbes, sweeping and howling through the garden, and my tent was dangerously bulged in on the windward side, and was stretched like a sail in a storm. The sky became overcast in a moment with black clouds, and some heavy raindrops fell. The night was pitch dark, and there was a noise as of a roaring flood outside.

At twelve o'clock on March 6 I was fetched by the ferrashes of the *Hakim* or Governor, and we marched in close order down the khiaban, which was now crowded with people, to view the performance on the greatest day of mourning in Moharrem. The air was warmer than usual, and the temperature was above 68°. We could hear from a distance the sounds of lamentation from the mollahs' tekkieh, where the performance was in full swing; but the Governor's tekkieh, which on ordinary days is a theological high school, was still quiet, for the day's performance had not yet commenced. We took a back way through a passage which led directly to my open *eivan* or niche. Here a number of spectators, mostly women, had assembled, but the place was cleared at once by the switches of the ferrashes. They have not the slightest respect for ladies. They drove them like a flock of sheep or cattle down into the court. There seemed to be at first only 500 spectators, but the crowds increased, and people streamed in through all the gates and entrances. As usual they flocked to my place to stare at the camera, and there they stood looking on with extraordinary patience. The large tent cover was this day raised a little to let in what little draught there was; but the shadow under the vaulted roof, where the Governor and his retinue, the higher dignitaries and ecclesiastics were placed, was still too dark to allow me to see clearly what was going on, and I could not, under any circumstance, gain an entrance to the place. The Governor himself had no objection, but the priests positively refused to sit beside an unbeliever. I had been especially told that on this day my two Cossacks should be with me, armed with rifles. The Persians are indeed peaceable and kind-hearted, but

if they abandon their habits on any one day in the year, it is on the 10th of Moharrem, when their fanaticism is at its height, and their religious passions are roused; when the death of Hussein, represented by clever actors, appeals to their hearts, and their imagination so carries them away that they fancy they can see the holy martyr offering his life for the sacred cause. Then they become wild, lose their self-control, and the sight of much human blood upsets their minds. Something may happen to cause their passions to overflow, only a spark is required to fire the train, and a European who happens to be present may become a victim for their knives. Therefore the Governor had surrounded me with a stronger guard than usual, and had warned me to see that the Cossacks of the Shah kept their powder dry.

Fifty-four women have taken up their position in front of my *eivan*. They see me, but I cannot see them. I sometimes catch a fleeting glimpse of a pair of dark eyes, cold in expression and warm in colour, at any rate mysterious, and bound by the strict rules of Mohammedan etiquette. Some go away when they have gazed long enough, and others take their places. They are dark blue like swallows, and presumably they twitter beneath their veils like swallows, audible only to their neighbours and not to others.

We had seen in the meidan a caravan of gaily decorated camels, hung with red and blue cloths and tufts, and bells which rang just as they do in the great deserts outside; it showed what was coming.

Now it begins! Now all eyes are turned to the arena, to which a passage is kept open by ferrashes. The caravan comes marching in from left to right. It consists of ten camels. On the first sits a rider who beats incessantly a pair of drums, and on the others men and boys of the people. Then follow the mules we have seen on our first visit, and then a crowd of men crying out the name of Hussein in regular time and all together. The whole company passes twice round the arena. An interval follows during which the Governor sends me a bouquet of flowers, fruits, and sweets. I wish to tip the messenger,

172. The First Round without Knives.

173. Fanatics Bespattered with Blood.

but he refuses to accept anything—a most unusual thing in Persia.

More shouts are heard. The crowd of spectators becomes closer, and they are packed together everywhere. After the horsemen in cuirasses come forty men who testify their grief at Hussein's death in a loathsome manner. Their dress consists only of a pair of wide white trousers, and their bodies, heads, and feet are bare. They walk in couples, not straight forwards as usual, but turned towards each other, taking side steps round the course. Those with their backs to us put out the left foot sideways along the course and then draw the right foot up to it. They are covered with blood, partly clotted, partly streaming over the face, breast, and white trousers. In their hands are sharp-pointed knives with which they cut vertical wounds in their heads and foreheads. Some have deep, long, and hideous wounds in the head, others cut themselves also in the breast and arms.

Walking face to face they incite and egg on one another, and stimulate their eagerness for self-torture. And when they are opposite my *eivan* and have thus completed half the circuit, they are wild, idiotic, and inspired by uncontrolled passion in their religious fanaticism. They keep time, smacking their soles against the pavement, and in time with their feet they plunge the knives into their heads and yell out their heartrending raucous "Ya Hussein." Their features are distorted, their looks frenzied and dreadful, they open their eyes wide to see better through the blood that is running over them. This bloody cortège reeks of blood, it leaves bloody footsteps behind, and those who come after tread in the blood of their predecessors.

The wild troop is attended by men on either side, whose duty it is to keep an eye on those who seem likely to lose control of themselves altogether, and may kill themselves by a too powerful blow. Then they interfere and forcibly remove the crazy man from the performance. The procession moves slowly round the arena, and it is wonderful if they all complete the circle alive. Not one comes off with a whole skin—that much is certain.

The sight of this bloody ceremony calls forth a feeling of disgust and abhorrence. And yet these fanatics, who should be an abomination to gods and men, are the object of the unfeigned admiration of their brother Shiites. The crowd bewailing the death of Hussein join in the bloody men's loud lamentations, and rejoice to see human blood offered in honour of Hussein and for his sake. The men are convinced that by their self-mutilation they gain both temporal and eternal benefits. They are a means in the hands of the priests of rousing and maintaining the religious convictions of the undiscerning people, without which the priesthood would perish from hunger.

This scene on the tenth day of Moharrem is the culmination of the passion-play, and it was because of the wild passions that then break loose that the Governor had surrounded me with an especial guard. Pollak relates that the imagination of the mob is sometimes fired to such a degree that the actor who plays the part of Hussein's murderer is attacked and slain. The self-mutilators who have injured themselves badly are carried off when the circuit is completed to a hammam or bathroom, where they are bound up and taken care of by surgeons—one would think that they ought to be flogged instead. Those who are less hurt can go on their own legs to the bath, and of some of these I took a snapshot with my camera.

In conclusion, there is a procession of half-naked men, who beat their breasts only with their hands and stretch up their arms to heaven, throwing their heads to one side and yelling and bawling till froth lies on their lips. And behind them a tabernacle called *nakl* is borne by fifty men, like a cage covered with cloths and mirrors. Two men have climbed on to the frame, which is carried round the arena, and possibly represents the sarcophagus and funeral procession of Hussein. Lastly, the camels make another round of the court, and therewith the Moharrem of the year comes to an end.

Then the crowd dispersed and we also hurried from the bloodstained place. We wanted fresh air, so we went towards the outskirts of the town where there was no one. The south-western gate of the town was photo-

174. The *Nakl* on the Day of Hussein's Death.

graphed, and then we enjoyed more than ever the peacefulness of our own garden, where I, wearied after the sad spectacle of the day, lay down to read, and, after the customary developing in the dark-room, was soothed to rest by the song of the bulbul and the howl of jackals.

CHAPTER XXXIX

THE DATE PALMS OF TEBBES

Tebbes lies in great isolation, and is cut off from the outer world, the nearest town being fully 80 miles distant. At the entertainments to which I was invited all, without exception, were inhabitants of Tebbes. Strangers seldom come hither, and then only those who have some particular reason—merchants and caravan-owners, for instance. The boundless desert extends in all directions, and a journey to a neighbouring town—Tun, Birjan, Yezd, or one of the towns of Khorasan—is quite an expedition. The small town leads its own life closely shut in by its walls, and, unaffected by influences from without, which follow the great highways and the caravans, it has retained its primitive character and peculiarities fairly unadulterated. Tebbes, then, gives the impression of a genuine native town; but the inhabitants complain bitterly of their isolated position, and say that if only one large caravan road passed through the place their prosperity and well-being would increase.

Yet the town is not completely closed. We have ourselves made acquaintance with the road from Khur, and others lead to Khorasan, Yezd, and Naibend. Tebbes has even regular postal connection with the great world. The post road to Meshed passes through Tun and Turbet-i-Haidari, and is divided into fourteen stages. The distance is reckoned at 93 farsakh, and men and horses are changed twelve times. A letter is forwarded in four or five days. This is indeed not the shortest way to Meshed, its longer distance being due to Tun and

175. A Lane between Palm Gardens.

Turbet, the post-bags from these places being collected by the same mounted courier. The direct cross cut runs more to the west, and is reckoned 80 farsakh. The post road to Yezd is divided into eleven stages, some of which are very long. The road to Seistan is reckoned 79 farsakh, and that to Halvan 20 farsakh long. The Naibend road is 30 farsakh; there is a road also to Birjan.

There is, besides, a road to Bahabad, which, as far as I know, has never been used by any European unless by Marco Polo. It runs through Kurit, Balucha, and Rizab. The statements of the distance vary from 48 to 53 farsakh.

I was much tempted to choose this road as the next stage on my journey southwards. We took counsel of a camel-owner who knew the road. He could not let out any of his camels on hire for such a journey just at the moment, for the desert was *gel* or slippery after the last rain; but if we liked to wait until the desert dried up he would willingly serve us. Two days before, a caravan of 300 camels had arrived from Sebsevar. It was going to Yezd and intended to pass through Bahabad, but had to wait at the village of Kurit outside Tebbes till the desert dried up. If we arranged so that we could set out in its wake, we should find the desert road dry in its trail. It would, of course, have been interesting to see this part of the desert, to cross another kevir depression, and to explore the continuation of the little range of hills we had crossed near Rabat-gur, but it would have taken us too far out of our course, and obliged us to give up the remarkable oasis of Naibend, from which we were also separated by little-known desert tracts. I therefore decided to go to Naibend, but on the way thither we heard so many interesting facts about the Bahabad desert that we made a compromise and took a long deviation to the west before reaching Naibend.

In Tebbes there are 200 large palm orchards and at least as many small ones. It is estimated that there are quite 100,000 female palms (*mader*); in every garden there are two male palms (*nehr*)—singularly enough the same word that is used to denote a camel stallion. The palms first bear fruit after fifteen or twenty years, but

palms are to be found which are two hundred years old. They are said to grow and grow, but never to rise above a certain height in consequence of the storms which occur from time to time, and the cold that prevails in winter above the warmer layer of air on the surface of the ground. The tallest palms I saw in Tebbes were 50 feet high or a little more, but they are usually much shorter, 23 to 26 feet. Here we are at the northern limit of the date palm. No palm is to be found north of the great Kevir, unless it be a single, well-protected specimen.

The Persians say that palms are like human beings; they languish and die from a gun-shot, they are drowned if they are flooded with water, and they are frozen to death by cold. The male palm has several wives, like the Mohammedans; the female is noble, delicate, and dainty, and must be tended with the greatest care; she is like a domestic animal which renders the most inestimable service to man. All Tebbes lives solely on the produce of palms, and there is no part of the palm but what is useful in some way. Dumb brutes can move from place to place, but the palm is fixed to one spot. She grows up from the root, and must some day decay and die in the same place. An old Persian said that the palm differed from other trees in having life and soul, and being able to think, mourn, and rejoice. If she is treated with kindness she feels gratitude, and lets dates ripen in large rich clusters under her crown of leaves, but if she is neglected, she becomes surly and omits to bear fruit.

The Seid, the one with the green sash, informed me that the townspeople liked to kill a palm or two during the Moharrem festival, and regale their guests with *penir-i-khorma* or palm cheese, which is considered the greatest delicacy the place affords. But only such palms are sacrificed as no longer bear fruit or which stand in the way. Otherwise it would be killing the goose which lays the golden eggs. But when there is good reason for the slaughter it is preferably postponed to the Moharrem festival, when date cheese plays the same part as Christmas pudding or the fatted calf with us.

176. A Group in the Court of the Harem.

177. A Gate in the Wall.

I was invited by the Seid to such a festivity on one of our last days in Tebbes. We witnessed the execution from a lawn in the garden. The victim was a fifty-year-old male palm, which was condemned because it had begun to decay of itself. A man binds a loop of bast round himself and the trunk, and swarms up to the top with great activity, planting his feet on the inequalities of the bark, and pushing up the loop of bast again and again. He cuts off the fronds with a sharp axe down to the stem; one after another they fall to the ground, till at last the palm is stripped bare and stands deprived of its crown among its old, still living comrades. Then all the protecting fibres and excrescences are removed from the upper part from which the tuft of fronds springs, and the soft sweet juicy mass called *penir-i-khorma* is extracted. We watch the whole process, and notice that the owner and servant of the garden, who have grown up beside the palm, and remember its history from its childhood, are sad and solemn as if they were committing an act of wickedness and treachery against an old friend. But their scruples soon vanish when a covered table is brought out, and the date cheese is cut into dice and eaten.

The Seid showed me in his garden two palms which were sixty years old. They stood only 5 feet apart, and while one was tall and thriving, the other was low and stunted. He said that if the tall palm were sacrificed, its stunted neighbour would raise itself up and grow to a proud height. Their roots, he said, went down to a depth of 115 feet, where the subsoil water lies.

Certainly Tebbes, for all its remoteness, solitude, and insignificance, is a pearl among the towns of Iran. What a charming paradise this oasis seems to the wanderer through the desert who comes hither from the long lonely road; how many pilgrims have slumbered with bright dreams under its shady palms; how many travellers have refreshed their throats, parched by the salt water of the wells, with its clear spring water from the hills; how many have appeased their hunger with its sweet plump dates! And from the top of the minaret the weary traveller can cast a look back at the last bit of silent desert country

he has crossed, the scene of his slow suffering progress in the burning sun and drought.

We had two months of desert behind us when we camped under the palms of Tebbes,—how gladly I would have stayed as long in the shade of the oasis! Emad-ul-Mulk tried to persuade me to do so with genuine Persian kindness. The whole oasis was mine, all his subjects were my servants. But I had no time to spare now, and between the palms floated a vision of the snow-capped mountains which awaited me far in the east, and among which, during the following years, I was to remember, on many a cold night, my sojourn in the beautiful Persian oasis.

I looked with a certain amount of respect southwards over the dreary country, where our bells would ring again during the succeeding days, and where the temperature would rise degree after degree, until at last it passed into suffocating heat on the frontier of India. Yonder the sun's rays already quivered over the sand pebbles and kevir as over a furnace which is just being heated up. On the large English map I had received in Teheran from Colonel Douglas the word "unexplored" lay to the south-west of Tebbes, just as over certain regions on the latest map of Tibet. But here, in Persia, the attractive word covers only a small patch, the part of the country which I call the Bahabad desert for want of a better name, because the road to Bahabad passes through it.

Whichever way I chose, we must in any case hire six camels, and on March 6 appeared a man who declared himself ready to put his best camels at our disposal. He undertook to lead us in ten days to Bahabad, and his animals could carry all the supply of straw and cottonseed we required. He asked 8 kran a day for each camel, and the price was to be the same if we altered our course on the way.

"Have you your camels here in Tebbes?" I asked.

"No, Sa'ab, they are grazing 3 farsakh off, but they will be here in the morning at sunrise."

"Your price is much too high. To pay 8 kran a day for a camel which is worth 50 tuman is absurd."

178. Gulam Hussein, 16 years old—Tebbes.

179. Muhamed, 40 years old—Tebbes.

"Sa'ab, remember that I must return the same way without a freight, that I must carry with me straw and cottonseed for my animals, and that their strength will be impaired by the journey. I shall also serve you as guide, and I know the country thoroughly."

I had nothing to reply to such forcible arguments, and accepted his offer.

At eleven o'clock the same night a terrific northerly storm burst, and groaned and cracked in the garden, and maps, letters, and sheets left out began a wild dance in the tent before they were hastily stuffed into their boxes. The wind was as usual accompanied by rain which increased during the night, and on the morning of the 7th had left puddles of water about and within the tent. The khiaban was turned into mud, and all the experts said that the road through the kevir in the direction of Bahabad would be absolutely impassable—it was the same bad luck we had experienced when we wished to cross the great Kevir. They thought that the Khorasan caravan, which had left Kurit two days before on its way to Bahabad, must have had a bad time.

On March 7, our last day in Tebbes, the air was sultry and heavy, and passing showers fell from time to time from the dense clouds. At one o'clock the temperature was 64.6°, but we felt that another atmospheric change was coming on. And indeed it came with surprising suddenness at half-past four, in the form of a first-class storm from the south-south-east. In our garden, however, the violence of the wind was considerably checked by the walls and the palms, their tufts of leaves thrown like besoms to the north-north-west. The southern sky glowed in changing tints of orange, and the air was filled with the finest dust. Now and then a few heavy raindrops fell. As the opening was turned to windward my tent caught the first gust; it bulged out like a balloon and was on the point of flying away. Mirza and Avul Kasim shut me in as well as they could and closed all the chinks; I lighted a candle, and could not employ myself with anything but reading. A deafening noise raged outside as of great waters; it was like being shut up in

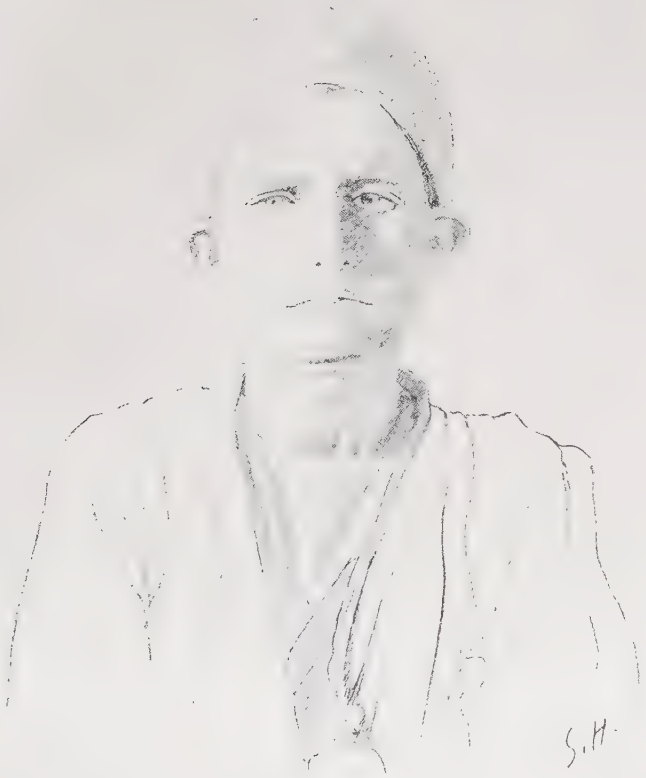
the cabin of a vessel which is beginning to sink, water rushing in from all sides and filling all with its roaring noise. No voices were heard, no shouts, and the howl of the jackals was drowned in the din of the storm. Now and then a withered palm leaf fluttered down on to the tent.

I had paid a farewell visit to Emad-ul-Mulk, given him some small presents, and thanked him for his generous hospitality. We had inspected the six new camels, which turned up at the right time, led by their owner. We had certainly not had enough of Tebbes, but we had witnessed the Moharrem festival, and knew that the inhabitants of the oasis would idle away their time till *no-rus*, the 26th of Moharrem, when more festivities would take place. Not till they are over is work resumed.

At nine o'clock at night the temperature was exactly the same as at one o'clock, that is, 64.6°. Then the storm abated a little, and the dismal laughing bark of the jackals was heard again. But immediately after ten o'clock the storm was renewed, accompanied by thunder and lightning —an unusual phenomenon in these regions. I had gone to bed and extinguished my candle, and I lay listening to the claps, and saw my tent lighted up as brightly as at mid-day, for the blue flashes were brilliant and dazzling. They quivered and trembled and darted, and lasted a remarkably long time, sometimes two seconds, before they were followed by the pitch-black darkness of night. The thunder rumbled first in the western hills, then gradually passed over to Kuh-i-shuturi, where it was nearer to us and therefore louder. The wind continued, and it rained hard and incessantly all night long. After this fresh downpour the road to Bahabad would be impracticable.

On the morning of the 8th the weather was not more promising; the minimum had been 47.7°, but the air felt chilly and damp, blue-black clouds threatened more rain, and there was no temptation to leave the little palm island in the desert sea.

My nightingale sang a soft and playful melody in gentle, tender tones on one of the palms outside my tent, a friendly song of farewell—it was really painful to leave



180. Gulam Riza, 14 years old—Tebbes.

this dear bird which had now kept me company for nine nights. The jackals were cunning. Once we heard some of them at the basin in the garden, and they availed themselves of the noise of the storm to approach from the windward, and outwit our dogs. They succeeded in snapping up our best cock as he sat dozing on a load outside the men's tent.

The court was full of people. The owner of the garden was present, a haji, ferrashes, purveyors, water-carriers, and peasants who daily supplied trusses of green sweet-smelling hay for our camels. All received their pay. We also laid in provisions in Tebbes for a long time, and the whole expenses amounted to £35.

Once more we pass down the endless khiaban, its walls echoing the clang of the bells, and mount at the Rudkhaneh-i-kale-bagh, which, issuing from a valley opening to the N. 63° E., flows just south of Tebbes. The river is now divided into numerous arms of grey turbid water after the last rain, most of them carrying about 35 cubic feet of water per second, and enclosing on both sides the village Deheshk. In the narrow shady lanes, and on the cultivated land, the ground is smooth and treacherous, and the camels' legs slip about as though they were practising skating, but soon we leave this little oasis also, and the last delta arms, with an aggregate volume of 700 cubic feet, are behind us. The oasis had been thoroughly flooded by the rain, and here and there a peasant is seen digging temporary trenches to retain the water. The rain in the night caused a large flood in the hills, large volumes of which have found their way down to the road, 5 farsakh below. The rise in the water commenced early in the morning, and the canal by my tent had threatened to overflow. On the upper parts of the hills there has been snow, and their crests look whiter than ever.

After we leave the last river arm the country becomes absolutely barren, and consists of sand and small pebbles. But the water still pours through its subterranean channels to the villages of Sadetabad, Mohamedabad, Sadikabad, and Deh-no, all lying to the right of and below our road, while Khosroabad lies to the left, at the foot of some small

hillocks, and well hidden in a ravine between them. The burial-ground of the village, however, is laid out close by the road, and it is not by chance that the guristan in Persia is almost always placed beside the highway, but purposely, that the dead may enjoy the company of the living, or that pilgrims, still wandering over the earth, may be reminded that they too must one day lie under gravestones. Or is it that the passers-by may, by their meditations and prayers, bring peace to the departed? A partially ruined funereal mosque stands beside a water-reservoir called Hauz-i-masar or Hauz-i-Khosroabad. It is full of water like all the others on the road. Hauz-i-Ali is the next. They are sheltered by brick vaults.

Two farsakh to the right is seen the white expanse of the kevir, like a large lake in which the hills are reflected. Our guide says that this kevir is now mostly covered with a shallow sheet of water after the late rain. A kevir always marks the lowest depression in a basin, and from its edge the land rises on all sides in slopes of detritus and hills, if never so slowly. All the drainage water, therefore, collects there, and after such a heavy rainfall as the last it is probable that a kevir so comparatively small as this one must be covered with water.

A succession of villages lies between our road and the kevir: Kerimabad, Kasimabad, Hemetabad, and Aliabad, but Kurit, quite a town of houses huddled closely together, and adorned with cupolas, stands on the road, and amidst its grey quarters stand palm trees attracting the eyes by their verdure. Immediately below the village large fields of wheat extend, fresh and beautiful, with green spring blades of corn. From Kurit caravans start which are going to Bahabad.

The great highway is in parts sunk into the yellow clay to a depth of 16 feet, the sides standing up like walls, and, after coming up to a level with the fields, crosses a number of irrigation streams, which flow in raised conduits. The country is extensively cultivated, and it is astonishing to find so much productive land in the midst of the desert. In direct connection with Kurit stand the villages Ibrahimabad-i-bala and Ibra-

181. A Ruined Gate.

182. Two Old Towers in Tebbes.

himabad-i-pain, or Upper and Lower Abraham's Town, and to the left Valiabad. In front of us rise the palms of Fahanunch, separated from us by a belt of hard sterile ground.

We march through the narrow lanes of the village, and encamp in a field by a small thicket of palms. Even the most squalid villages assume a handsome and comfortable aspect owing to the palms, and the greyest and most dismal lane looks picturesque when palms wave their crowns above it. In this tract, however, palms are of less importance than wheat, barley, and millet. Cotton also is grown.

Fahanunch has 140 houses, Kurit 250; below the former are also two more villages, Muessinabad and Saghabad. The Bahabad road from Kurit, already mentioned, passes also through Fahanunch, and the villagers asserted that the belt of kevir on this road would even now not be too dangerous to cross. A caravan-owner intended to set out in two days. He said that wild asses were very numerous in the Bahabad desert.

"If you can procure me a perfect and faultless specimen of a stallion, I will give the hunter 10 tuman," I suggested.

"Ten tuman!" exclaimed a man, while the other bystanders stared dumfoundered at one another; "for 10 tuman you can have five wild asses if you like."

"I do not want more than one."

"They are very numerous on the way to Bahabad. They are certainly harder to find after rain, when they can get water anywhere; but there is a hunter in one of the neighbouring villages who is well acquainted with their habits, and who never goes on the chase without bringing back four or five skins."

This crack marksman was sent for and commissioned to go on in front during the night and meet me on the road with his wild ass. I believe he did his best, but he could not obtain a wild ass. He had killed two hundred wild asses, and he received 2 tuman for a skin. Though unsuccessful in his proper task, he was still of service to us, for he knew all about the country.

Fahanunch (2238 feet) is also a fine place with fresh murmuring water and palms, but it cannot compare with Tebbes. The jackals here were bolder than ever. As soon as it grew dusk they turned up in packs, and their loud, curious laugh filled the air. I always wondered where they spent the day, for they do not go on their prowls as long as the sun is up. The people replied to my question that the jackals hide themselves during the day in the ravines and hills, but spring up like mushrooms as soon as twilight comes. But still one ought to see them occasionally during the day! As a matter of fact not a shadow of one is ever seen, and the dogs never stand and bark at their lairs. In the autumn they go rummaging for fallen dates under the palms.

183. Tall Palms in the Outskirts of Tebbes.

184. Posed Groups.

185. Nomads' Tent in Tebbes.

186. Our Camp at Fahanunch.

CHAPTER XL

MARCO POLO

In Sir Henry Yule's admirable work on the journey of the Venetian, which in 1903 was published in a third edition by Henri Cordier, is found a map of Western Asia, on which Marco Polo's route is marked. It traverses the whole of Eastern Persia from Hormuz straight northwards through Kerman, Cobinan, and Tebbes to the country between Sebsevar and Shahrud, whence the route turns at right angles to the east through Sebsevar and Meshed into Central Asia.

Marco Polo gives the following accurate and succinct description of the Persian desert:[1]—"On departing from the city of Kerman you find the road for seven days most wearisome; and I will tell you how this is. The first three days you meet with no water, or next to none. And what little you do meet with is bitter green stuff, so salt that no one can drink it. . . . It is the same with the salt which is made from those streams; no one dares to make use of it. . . . Hence it is necessary to carry water for the people to last these three days; as for the cattle, they must needs drink of the bad water I have mentioned, as there is no help for it, and their great thirst makes them do so. But it scours them to such a degree that sometimes they die of it. In all those three days you meet with no human habitation; it is all desert, and the extremity of drought. Even of wild beasts there are none, for there is nothing for them to eat. After those three days of desert you arrive at a stream of fresh water running underground, but along

[1] Yule's *Marco Polo* (1874), vol. i. pp. 126 *et seq.*

which there are holes broken in here and there, perhaps undermined by the stream, at which you can get sight of it. It has an abundant supply, and travellers, worn with the hardships of the desert, here rest and refresh themselves and their beasts. You then enter another desert which extends for four days; it is very much like the former, except that you do see some wild asses. And at the termination of these four days of desert the kingdom of Kerman comes to an end, and you find another city which is called Cobinan." "When you depart from this city of Cobinan you find yourself again in a desert of surpassing aridity, which lasts for some eight days; here are neither fruits nor trees to be seen, and what water there is is bitter and bad, so that you have to carry both food and water. The cattle must needs drink the bad water, will they nil they, because of their great thirst. At the end of those eight days you arrive at a province which is called Tonocain. It has a good many towns and villages, and forms the extremity of Persia towards the north."

The three names are still found in all maps of Persia, and the only differences are that Kerman is not a kingdom but a province, Kuh-benan not a large town but a village, surrounded by mulberry trees and gardens, and the province Tun-o-Kain is now called Tun-ve-Tebbes. As regards the intervening desert tracts, Marco Polo's description is as correct now as in the year 1272. The row of holes or wells he mentions is, of course, an ordinary irrigation canal or kanat. The water in the wells is often as deleterious to the stomach now as then.

From the brief description three geographical points stand out, but which way Marco Polo followed between Kuh-benan and Tun-o-Kain is hard to say. Yule assumes that he made his entry into Tun-o-Kain through Tebbes. Lord Curzon supposes that he took the eastern route and crossed the northern part of the Dasht-i-Lut.[1]

Sir Frederic Goldsmid expresses an opinion that Marco Polo's route from Kuh-benan to Tebbes and farther northwards "may well be supposed to take in something of *kavir*." He considers that Marco Polo's description of

[1] *Persia*, vol. ii. p. 248.

the eight days of desert is not at all at variance with the experiences of travellers through the great Kevir in more recent times.[1]

Major Sykes says: "This section of the Lut has not hitherto been rediscovered, but I know that it is desert throughout, and it is practically certain that Marco ended these unpleasant experiences at Tabas, 150 miles from Kubanán."[2]

After another journey and a visit to Tebbes Sykes altered his views, believing that Marco Polo travelled from Kuh-benan through Naibend to Tun. "This new information, I would urge," he says, "makes it almost certain that Ser Marco travelled to Tun, as Tabas falls to the west of the main route."[3] In the description of his fifth journey in Persia Sykes again suggests that Marco Polo travelled through Naibend, and on the sketch map accompanying his interesting article the route of the Venetian traveller is accordingly drawn through this oasis.[4]

The same opinion was expressed as long ago as 1882 by Colonel C. E. Stewart, who also visited Naibend during his great journey in Eastern Persia. He says regarding it: "I was much interested in hearing of Kuh Banan, as it is one of the places mentioned by Marco Polo as on his route. Kuh Banan is described as a group of villages about 26 miles from the town of Rawar, in the Kárman district. I cannot help thinking the road travelled by Marco Polo from Kárman to Kain is the one by Naiband. Marco Polo speaks of Tun-o-Cain, which, Colonel Yule has pointed out, undoubtedly means Tun and Kain. At present Tun does not belong to the Kain district, but to the Tabbas district, and is always spoken of as Tun-o-Tabbas; and if it belonged, as I believe it formerly did, to the Kain district, it would be spoken of as Tun-o-Kain, exactly as Marco Polo does. Through Naiband is the shortest and best road to either Tun or Kain."[5]

[1] *Proceed. of the Roy. Geogr. Soc.* vol. xii. (1890), p. 586.
[2] *Ten Thousand Miles in Persia*, p. 273.
[3] *Geogr. Journal*, vol. xxvi. p. 465.
[4] *Ibid.* vol. xxviii. p. 562.
[5] *Proceed. of the Roy. Geogr. Soc.* vol. viii. (1886), p. 144.

Several travellers have visited Kuh-benan in more recent times. Marco Polo's description of it runs as follows: "Cobinan is a large town. The people worship Mahommet. There is much Iron and Steel and *Ondanique*, and they make steel mirrors of great size and beauty. They also prepare both *Tutia* (a very good thing for the eyes) and *Spodium*."[1] Then follows a description of the process of manufacture. Here we need not enter into Yule's and Cordier's thorough and exhaustive notes on this paragraph. Schindler, Sykes, and others have made valuable contributions to the subject. Yule says at the same place: "We may be certain that there is now no place at Kuh-Banan deserving the title of *une cité grant*, nor is it easy to believe that there was in Polo's time." That, however, already two hundred years before his time a town actually existed there is shown by the following quotation from Makdisi: "Koh-benan is a small town with two gates and a suburb, in which there are baths and an inn; at one of the gates is the mosque. The town is closely surrounded by gardens, and there are hills near. The bazaar is small, and there is little knowledge and deep learning to be found. For two days' journeys before and after Koh-benan there are many cupola roofs and cisterns." Yakut reports that: "Ko-benan is a town in Kerman, to which the place Behabadh also belongs, where tutia is made and sold," and further: "Behabadh is a place in Kerman; here and in Ko-benan the people occupy themselves in the manufacture of tutia, an article which is sent all over the world."[2] Here Kuh-benan is mentioned as pursuing the same industry as Bahabad, and therefore it is probable that the two places were in close communication with each other, and that a traveller who was making for the north might easily think of taking the road from Kuh-benan to Bahabad. Tomaschek does not believe that Marco Polo travelled through Zarand when he traversed seven days' journey through the desert to Cobinan. This seems, however, a hasty conclusion, as the Venetian has just spoken of the refreshing rest half-way.

[1] Yule's *Marco Polo*, p. 128.
[2] Tomaschek, *Zur historischen Topographie von Persien*, vol. ii. p. 47.

As even Sykes, who travelled during several years through Persia in all directions, cannot decide with full certainty whether Marco Polo travelled by the western route through Tebbes or the eastern through Naibend, it is easy to see how difficult it is to choose between the two roads. I cannot cite the reasons Sir Henry Yule brings forward in favour of the western route—it would take us too far. I will, instead, set forth the grounds of my own conviction that Marco Polo used the direct caravan road between Kuh-benan and Tebbes.

The circumstance that the main road runs through Naibend is no proof, for we find that Marco Polo, not only in Persia but also in Central Asia, exhibited a sovereign contempt for all routes that might be called convenient and secure.

The distance between Kerman and Kuh-benan in a direct line amounts to 103 miles. Marco Polo travelled over this stretch in seven days, or barely 15 miles a day. From Kuh-benan to Tebbes the distance is 150 miles, or fully 18 miles a day for eight days. From Kuh-benan *via* Naibend to Tun the distance is, on the other hand, 205 miles, or more than 25 miles a day. In either case we can perceive from the forced marches that after leaving Kuh-benan he came out into a country where the distances between the wells became much greater.

If he travelled by the eastern route he must have made much longer day's journeys than on the western. On the eastern route the distances between the wells were greater. Major Sykes has himself travelled this way, and from his detailed description we get the impression that it presented particular difficulties. With a horse it is no great feat to ride 25 miles a day for eight days, but it cannot be done with camels. That I rode 42½ miles a day between Hauz-i-Haji-Ramazan and Sadfe was because of the danger from rain in the Kevir, and to continue such a forced march for more than two days is scarcely conceivable. Undoubtedly Marco Polo used camels on his long journeys in Eastern Persia, and even if he had been able to cover 205 miles in eight days, he would not be obliged to do so, for on the main road through Naibend and Duhuk to Tun there

are abundant opportunities of procuring water. Had he travelled through Naibend, he would in any case have had no need to hurry on so fast. He would probably keep to the same pace as on the way from Kerman to Kuh-benan, and this length he accomplished in seven days. Why should he have made the journey from Kuh-benan to Tun, which is exactly double as far, in only eight days instead of fourteen, when there was no necessity? And that he actually travelled between Kuh-benan and Tunocain in eight days is evident because he mentions this number twice.

He also says explicitly that during these eight days neither fruits nor trees are to be seen, and that you have to carry both food and water. This description is not true of the Naibend route, for in Naibend there are excellent water, fine dates, and other fruits. Then there is Duhuk, which, according to Sykes, is a very important village with an old fort and about 200 houses. After leaving Duhuk for the south, Sykes says: "We continued our journey, and were delighted to hear that at the next stage, too, there was a village, proving that this section of the Lut is really quite thickly populated."[1] This does not agree at all with Marco Polo's description.

I therefore consider it more probable that Marco Polo, as Sir Henry Yule supposes, travelled either direct to Tebbes, or perhaps made a trifling détour to the west, through the moderate-sized village Bahabad, for from this village a direct caravan road runs to Tebbes, entirely through desert. Marco Polo would then travel 150 miles in eight days compared with 103 miles in seven days between Kerman and Kuh-benan. He therefore increased his speed by only 4 miles a day, and that is all that is necessary on the route in question.

Bahabad lies at a distance of 36 miles from Kubenan—all in a straight line. And not till beyond Bahabad does the real desert begin.

To show that a caravan road actually connects Tebbes with Bahabad, I have inserted in the first and second columns of the following table the data I obtained in Tebbes and Fahanunch, and in the third the names

[1] *Ten Thousand Miles in Persia*, p. 35.

marked on the "Map of Persia (in six sheets) compiled in the Simla Drawing Office of the Survey of India, 1897."

From Tebbes to Bahabad.		*From Fahanunch to Bahabad.*	
1. Kurit	4		
2. Moghu	9	2. Moghu	$4\frac{1}{2}$
3. Sefid-ab	6	3. Sefid-ab	6
4. Burch	5	4. Belucha	5
5. God	5	5. God-i-shah-taghi	6
6. Rizab	6	6. Rizab	5
7. Pudenum	8	7. Teng-i-Tebbes	$4\frac{1}{2}$
		7. Pudenun	$4\frac{1}{2}$
8. Ser-i-julge	4	8. Kheirabad	4
9. Bahabad	4	9. Bahabad	4
Farsakh	51	Farsakh	$43\frac{1}{2}$

Map of Persia

2. Maga	salt well.
3. Chashma Sufid	„ „
4. Khudafrin	sweet spring.
4. Pir Moral	salt well.
5. God Hashtaki	„ „
6. Rezu	„ „

These details are drawn from different authorities, but are in excellent agreement. That the total distances are different in the first two columns is because Fahanunch lies nearer than Tebbes to Bahabad. Two or three discrepancies in the names are of no importance. Burch denotes a castle or fort; Belucha is evidently Cha-i-beluch or the well of the Baluchi, and it is very probable that a small fort was built some time or other at this well which was visited by raiders from Baluchistan. Ser-i-julge and Kheirabad may be two distinct camping-grounds very near each other. The Chashma Sufid or "white spring" of the English map is evidently the same place as Sefid-ab, or "white water." Its God Hashtaki is a corruption of the Persian God-i-shah-taghi, or the "hollow of the royal saxaul." Khudafrin, on the other hand, is very apochryphal. It is no doubt Khuda-aferin or "God be praised!"—an ejaculation very appropriate in the mouth of a man who comes upon a sweet spring in the midst of the desert. If an Englishman travelled this way he might

have mistaken this ejaculation for the name of the place. But then "Unsurveyed" would hardly be placed just in this part of the Bahabad desert.

The information I obtained about the road from Tebbes to Bahabad was certainly very scanty, but also of great interest. Immediately beyond Kurit the road crosses a strip of the Kevir, 2 farsakh broad, and containing a river-bed which is said to be filled with water at the end of February. Sefid-ab is situated among hillocks and Burch in an upland district; to the south of it follows kevir barely a farsakh broad, which may be avoided by a circuitous path. At God-i-shah-taghi, as the name implies, saxaul grows (*Haloxylon Ammodendron*). The last three halting-places before Bahabad all lie among small hills.

This desert route runs, then, through comparatively hilly country, crosses two small kevir depressions, or offshoots of one and the same kevir, has pasturage at at least one place, and presents no difficulties of any account. The distance in a direct line is 113 miles, corresponding to 51 Persian farsakh—the farsakh in this district being only about 2.2 miles long against 2.9 in the great Kevir. The caravans which go through the Bahabad desert usually make the journey in ten days, one at least of which is a rest day, so that they cover little more than 12 miles a day. If water more or less salt were not to be found at all the eight camping-grounds, the caravans would not be able to make such short marches. It is also quite possible that sweet water is to be found in one place; where saxaul grows driftsand usually occurs, and wells digged in sand are usually sweet.

During my stay in Tebbes a caravan of about 300 camels, as I have mentioned before, arrived from Sebsevar. They were laden with *naft* (petroleum), and remained waiting till the first belt of Kevir was dried after the last rain. As soon as this happened the caravan would take the road described above to Bahabad, and thence to Yezd. And this caravan route, Sebsevar, Turshiz, Bajistan, Tun, Tebbes, Bahabad, and Yezd, is considered less risky than the somewhat shorter way through the great Kevir. I

187. Persian Boys.

myself crossed a part of the Bahabad desert where we did not once follow any of the roads used by caravans, and I found this country by no means one of the worst in Eastern Persia.

In the above exposition I believe that I have demonstrated that it is extremely probable that Marco Polo travelled, not through Naibend to Tun, but through Bahabad to Tebbes, and thence to Tun and Kain. His own description accords in all respects with the present aspect and peculiarities of the desert route in question. And the time of eight days he assigns to the journey between Kuh-benan and Tonocain renders it also probable that he came to the last-named province at Tebbes, even if he travelled somewhat faster than caravans are wont to do at the present day. It signifies little that he does not mention the name Tebbes; he gives only the name of the province, adding that it contains a great many towns and villages. One of these was Tebbes.

The next two geographical names we find in Marco Polo's book are Sapurgan and Balc, that is, the towns of Shibirkhan and Balkh in northern Afghanistan, but before he comes to Sapurgan he has travelled for six days through a country of "fine plains and beautiful valleys and pretty hillsides producing excellent grass-pasture, and abundance of fruits, and all other products." And here he finds "a goodly number of towns and villages, in which the people are worshippers of Mahommet. Sometimes also you meet with a tract of desert extending for 50 or 60 miles or somewhat less. . . . So after travelling six days, as I have told you, you come to a city called Sapurgan."[1]

From this it is apparent that the six days' journey of fine country were traversed immediately before Marco Polo reached Sapurgan. Sir Henry Yule says in a note: "Whether the true route be, as I suppose, by Nishapur and Meshid, or, as Khanikoff supposes, by Herat and Badghis, it is strange that no one of those famous cities is mentioned. And we feel constrained to assume that something has been misunderstood in the dictation, or has dropped out of it." Yule removes the six days of fine

[1] Yule's *Marco Polo*, p. 155.

country to the district between Sebsevar and Meshed, and considers that for at least the first days' marches beyond Nishapur Marco Polo's description agrees admirably with that given by Fraser and Ferrier.

I travelled between Sebsevar and Meshed in the autumn of 1890, and I cannot perceive that Marco Polo's description is applicable to the country. He speaks of six days' journey through beautiful valleys and pretty hill-sides. To the east of Sebsevar you come out into desert country, which, however, passes into fertile country with many villages.[1] Then there comes a boundless dreary steppe to the south. At the village Seng-i-kal-i-deh you enter an undulating country with immense flocks of sheep. "The first stretch of the road between Shurab and Nishapur led us through perfect desert . . .; but the landscape soon changed its aspect; the desert passed by degrees into cultivated lands, and we rode past several villages surrounded by fields and gardens. . . . We here entered the most fertile and densely peopled region in Khorasan, in the midst of which the town of Nishapur is situated." Of the tract to the east of Nishapur I say: "Here are found innumerable villages. The plain and slopes are dotted with them. This district is extraordinarily densely inhabited and well cultivated." But then all this magnificence comes to an end, and of the last day's journey between Kademgah and Meshed I write: "The country rose and we entered a maze of low intricate hillocks. . . . The country was exceedingly dreary and bare. Some flocks of sheep were seen, however, but what the fat and sleek sheep lived on was a puzzle to me. . . . The dismal landscape was more and more enlivened by travellers. . . . To the east stretched an undulating steppe up to the frontier of Afghanistan."

The road between Sebsevar and Meshed is, in short, of such a character that it can hardly fit in with Marco Polo's enthusiastic description of the six days. And as these came just before Sapurgan, one cannot either identify the desert regions named with the deserts about the middle course of the Murgab which extend between

[1] *Genom Khorasan och Turkestan*, vol. i. pp. 123 *et seq.*

Meshed and Shibirkhan. He must have crossed desert first, and it may be identified with the nemek-sar or salt desert east of Tun and Kain. The six days must have been passed in the ranges Paropamisus, Firuz-kuh, and Bend-i-Turkestan. Marco Polo is not usually wont to scare his readers by descriptions of mountainous regions, but at this place he speaks of mountains and valleys and rich pastures. As it was of course his intention to travel on into the heart of Asia, to make a détour through Sebsevar was unnecessary and out of his way. If he had travelled to Sebsevar, Nishapur, and Meshed, he would scarcely call the province of Tun-o-Kain the extremity of Persia towards the north, even as the political boundaries were then situated.

From Balkh his wonderful journey proceeded farther eastwards, and therefore we take leave of him. Precisely in Eastern Persia his descriptions are so brief that they leave free room for all kinds of speculations. In the foregoing pages it has been simply my desire to present a few new points of view. The great value of Marco Polo's description of the Persian desert consists in confirming and proving its physical invariableness during more than six hundred years. It had as great a scarcity of oases then as now, and the water in the wells was not less salt than in our own days.

CHAPTER XLI

A DESERT LAKE

On March 9 our tinkling train moves right through the village between its grey walls and fields and over the last canals, and suddenly finds itself in complete desert, true kevir, pure white as newly fallen snow from a thin layer of salt crystals, and here and there only supporting some stunted tamarisks. Our road runs due west-south-west, and we follow an erosion furrow which has lately carried water. Over the kevir to the south and south-west hovers a dense mist like rising steam, and the hills in front of us are enveloped in thick clouds which hide the view over the country.

Then follows a belt of yellow slimy clay, where foot-prints a foot deep have been left by the camels which went to Bahabad five days ago. But this clay, which soon changes into a belt of a darker colour, is now dry on the surface, and has split up into countless polygons slightly concave, and with deep, sharp-edged cracks between them, produced by drying and in their turn hastening the process.

We were now approaching the most dangerous part of all the road to Bahabad, a stream bed 130 feet broad and 3 feet deep, which seems here to come from N. 20° E. I sent two men to examine this nameless salt drainage channel which flows very slowly to a permanent desert lake situated farther south. Near its banks the ground was so wet and soft that it seemed absolutely impracticable for camels. The bottom of the bed would, however, bear at a certain ford, but if a camel strayed a little to one side

188. Fahanunch.

189. Muessinabad.

it sank in the mud, and one of our guides had lost a camel in this way the year before. A little water remains in the deeper parts, even through the summer, but elsewhere the bed is shallow and white from salt efflorescence. Farther along the road to Bahabad two rather smaller streams have to be crossed, and the last lay only a farsakh south-west of that which stopped us.

I could obtain no clear information as to the origin of the three streams; they were said to flow through parts of the desert never visited by man. It is also probable that they change their course in this flat country. Possibly they are delta arms of one and the same drainage channel. It often happens that the water in the beds remains quite insignificant after heavy rain in the neighbourhood of Fahanunch; or on the other hand that it rises considerably, even when it does not rain at all down here. Thence it may be concluded that their sources are at a great distance. Most certainly the rain-water collects from all the northern half of the Tebbes basin, especially from Kuh-i-shuturi, and a large contribution, perhaps the chief volume of the water, comes from the flood channels we crossed round the village Deheshk south of Tebbes.

We were forced by the obstacle that thus stood in our way to make a long circuit to the east, for we had now to pass round the lake into which this stream emptied itself. We therefore turned to the east, and went up a dry furrow full of washed-down vegetable matter, and then were stopped again by a small superficial rivulet, the outflow of an irrigation canal, which seemed very innocent and insignificant; but the ground about this kennel was softened to such an extent that it was not worth while trying to get the camels over. They sank deeply in the yielding mud, and we had patiently to follow the canal all the way to the great Pervadeh road, where the ground bore.

Mohamedabad is a hamlet of a few huts, palms, and tilled fields, and near it rise a few low mounds, the extreme offshoots of the eastern heights. Then we come again into absolutely barren desert of pebbles and sand where not the smallest weed grows. The morning was very

gloomy, but at 11 o'clock the sun comes out, while the south-eastern sky is still shrouded in dense clouds. The farther south we travel the more Kuh-i-jemal separates itself from the rest of the group on the west, and between the two yawns a great valley, where, it seems, there is no road. Between Kuh-i-jemal and Kuh-i-margho, the farther, southern snowy group, a road leads to Duhuk.

The road to Pervadeh is certainly plainly marked, but shows no sign of frequent traffic. It is crossed by numerous small trenches from the eastern foothills, which now stand at a distance of $1\frac{1}{4}$ miles. It is barely half as far in the other direction to the edge of the white kevir.

South-south-east stands on the horizon Mossenabad (Muessinabad), with a few huts and palms, which very slowly grow larger. Kele-hauz-i-Mad-Kasim collects the rain-water from one of the furrows which descend to the kevir, and is now filled to the brim with fresh water. A row of low hills of equal height stretches unbroken to the left like a terrace or an old lake shore, but the extreme skirts of the Jemal group, hitherto standing free, are more and more obscured by other advancing mountains. Massive, short and lofty, Kuh-i-margho rises to the east-south-east, and in the gap between the two groups are seen low hills over which the road to Duhuk crosses a pass or a *gudar* (defile).

Looking west-north-west, we can distinguish from the road the following different belts: (1) hard dry ground with fine pebbles, sand, and exceedingly scanty shrubs: (2) yellow, hard clay, with a very slight fall; (3) white kevir still partially wet, but drying more quickly than the level kevir, because of its gentle slope towards the bottom of the depression; (4) level kevir with a thin layer of water.

Muessinabad proved to be a charming little village, with few palms, but those were fine and well kept, and were tastefully arranged round the old quadrangular fort and its round corner towers. The walls were deeply fluted, and between the grooves clay stood in raised ridges like stalactites, showing that the stronghold reared as a protection against the Baluchis has often been

190. Muessinabad.

191. Pervadeh.

deluged with rain. The road runs close beside the fortress wall, and in the old moat, so that the wheat-fields on the left lie some 6 feet above the level of the road. Palms are planted round the fields to retain by their shade the moisture from irrigation. A rain-pool was still left where the camels drank their fill.

As the camels proceed with their deliberate gait south-eastwards, and the palms of Muessinabad grow smaller behind us, we have again a feeling of steering out into a dreary sea, the even desolate plain, so silent, lifeless, and lonely. We are surprised to see some dark specks in front of us, which at length turn into two men, a woman, and a boy, who with camels set out yesterday from Pervadeh.

At a nameless hauz in a furrow, which debouches into the lake about half a mile away, we set up our tents.

During the last bit we had this lake fairly near to the right of the road, and that it was a lake and not, as is often the case, an illusion due to mirage was manifest from the dancing of the sun's rays upon it. To determine the course of the shore and take some photographs I went down to the bottom of the furrow, where some meagre plants found a hold. The furrow was dry, and opened into dark lumpy kevir, with salt patches here and there on its surface. It was dry and hard, but the ground beneath was soaked and soft. Next the shore, which runs out in small bays and creeks to the south and west-north-west, winds a belt of hard kevir mud impregnated with salt, and its surface had quite recently been under water, to judge by the fine ripple marks caused by waves. At the mouth of the furrow this belt has a breadth of 40 yards, but elsewhere it is several hundred yards broad, and away to the south and south-east several miles. The lake mirror seemed to be at most 6 miles broad to the south-west. The sheet of water lay spread over the desert as clean as a sheet of paper. At our shore the water was only an inch or two deep, but it became deeper out towards the central parts of the lake. The water is of course super-saturated with salt. The lake bottom bears well, and it is possible to walk a long distance on the crystallized salt,

towards the middle of the lake. The layer of salt is barely half an inch thick.

It was positively affirmed that this lake was permanent, and never disappeared during the heat of summer, a circumstance which shows that its surface is on a level with the ground-water. It is clear that it occupies the deepest depression of the Kevir basin, but it can also be taken for granted that its surface fluctuates. It must rise after heavy rain, as is also manifest from the recently flooded shore belt with its wave-marks. It must shrink in summer, when evaporation and the insolation of the desert are excessive. But it must also be gradually filling up with mud brought by the temporary streams which enter it from all sides after rain. The large river we saw below Fahanunch was thick with mud, but the lake water was quite clear, so that the mud must have settled on the bottom of the shallow lake. When this process has been repeated every year, century after century, the depression must be levelled, filled up, and obliterated. Different kevir depressions are in different stages. Thus the parts of the great Kevir we crossed were quite filled up, and only allowed small sheets of water to collect on their salt layers. But here we had found a kevir with its deepest part not yet filled up, and where, therefore, the water still lay exposed. This phenomenon has its counterpart in certain of Tsaidam's salt lakes.

It was not easy to obtain any accurate notion of the dimensions of this lake. Its shores are, especially on the south-east and north-west, exceedingly flat, and a very trifling rise would cause large areas of land to be flooded. Therefore the lake may be often larger than in this year. It is, however, long, and parallel to the longer axis of the basin. On the north-eastern shore the hard detritus-covered ground abuts in terraces on the present flat shore belt. It is, indeed, intersected by a number of ravines and trenches, but its front is, nevertheless, sharply defined, and there need not be a moment's doubt as to its origin; it is an old shore terrace left behind from a time when the sea was much larger than now.

The lake has no particular name; it is called *ab-i-kevir*,

192. Silt and Kevir Ground on the Shore of the Ab-i-Kevir.

or simply *ab*, or again *darya*, which signifies sea or lake. It assists greatly in explaining the origin of the great Kevir, and when one sees this *ab-i-kevir*, which, by the way, is not marked on maps of Persia, one can understand that the great Kevir must, at one time, have been in the same stage, and have contained one or more now vanished lakes.

From Rabat-gur Kuh-i-shuturi presents itself as a long range, but now we see it more and more foreshortened, till at length it looks like a single summit. The other mountain groups spread out, and almost due south a smaller hill comes into view, named Kuh-i-torosho. Kuh-i-margho is absent from the English map, and the country here is in general very inaccurately portrayed.

In the evening a yellow scorpion came walking round the mangal in my tent. It had probably been called back to life by the warmth of the fire, for it was somewhat early for this loathsome insect to wake from its sleep. Wonderful that it can find nourishment in this dry and barren ground! At any rate, it was a herald which reminded me that the time was drawing near when we must look out for the poisonous inhabitants of the ground.

When we started on March 10 we could do nothing but march south-east to the village Pervadeh, for only from there could we turn off westwards; elsewhere we should be stopped by the continuation of the lake and by wet kevir. The Seid, who let us the six camels on hire, came in at the last moment with a supply of bread carried by a seventh camel, and with him as leader we continued our wanderings over slightly uneven, pebbly ground intersected by shallow drainage furrows.

After a farsakh we came to a bay or offshoot of the kevir, here dark, there white with salt, and sometimes very wet. To judge from the camels' track it must recently have been very soft. It took us almost an hour to cross it, but when necessary one can pass all round it to the east, where it stretches up to the low, even-topped hills we have followed all the way from the neighbourhood of Tebbes, and which seem to mark the limit of the lake's extent at an earlier period.

The kevir then passes into yellow clay with a flat surface, where a few meagre plants grow on conical elevations, and at the base of these driftsand is often heaped up. Strips of fine, water-borne pebbles are often spread over the clay, forming the outermost offshoots from the screes on the hills.

By ten o'clock it felt burning hot, and we longed for the cooling breezes which sometimes came down from the north-west, and yet the temperature rose above 63°; but the sky was perfectly clear, and the sun, lord of spring and summer, gave us a foretaste of his might. Every day we should fall more and more into his power, and our only reward would be to see the landscape slowly change its form and aspect. New ranges and summits rise above the horizon in front of us, while the old disappear in the dim distance. Kuh-i-shuturi appears still more contracted and insignificant, and the western hills, which we crossed at Rabat-gur, vanish one after another and run together into a vague contour.

Now the ground is hard again, and here and there a tamarisk grows. A stone marks the point where we have come to the end of the second farsakh, and whence a path turns off south-westwards to cross the kevir to Bahabad; it is used only when it is impossible to cross the river at Fahanunch, but now it is considered impracticable, because the kevir farther out is wet and slippery. To the south-south-west appears the mirror of another lake, probably only a continuation of the *ab-i-kevir*, and an interval of flat mud may divide the two sheets of water. This new surface, which seems to lie at the foot of Kuh-i-torosho, is remarkable for its deep blue colour.

The road runs over three distinct furrows, 6 to 10 feet deep, making south-west for the adjacent edge of the kevir. They come from the highlands of Kuh-i-jemal, and are probably delta arms of one and the same channel. Around them the country is quite undulating.

Hauz-i-kaffe is a cistern covered in with a vault of mud, and now full of good fresh water. An enterprising man keeps a small booth here, where a glass of tea, dried fruit, and a kalian can be got.

To the south and south-east the wreath of hills closes in still more, and runs together into a single, jagged outline, which, however, is at some places quite low. The even terrace of hillocks on the left retires. S. 33° W. is seen a lake mirror, but due south-west only white strips of kevir.

The dry trenches we cross become more numerous, all pointing south-west to the kevir. Most of the plants grow on their bottoms. They indicate a considerable drainage from the hills in the rainy season, and explain the formation of a permanent lake. The abundant steppe vegetation interferes with the progress of the camels, for they graze as they march. One furrow running south-south-east affords us a very convenient road for a while; it opens into a bay of the kevir pointing east. Luxuriant tamarisks grow here in great abundance, and the belt stretches a good bit to the west, where the bushes are conspicuous as dark specks against the light ground of the kevir. In one furrow the well Cha-sadak yields salt water.

The huge long basin we have followed all the way from Rabat-gur now narrows south-eastwards, and the skirting hills become more distinct in the course of the day, especially the western. Along the foot of the southern part of the latter a belt of driftsand extends.

The labyrinth of white flat mounds, cones, and ridges through which the road runs now comes to an end, and we emerge on to even kevir ground, white with salt on the surface and slippery in parts, so that the foot-pads of the camels slide and leave a long impression. Here and there grow reeds, *bishe*, in abundance, and the track has the appearance of a frozen swamp with yellow reeds sticking up out of the ice. Soon this very wet depression ceases, and a flat, spoon-shaped elevation, 6 to 16 feet high, and forming the outermost edge of the detritus slope towards the salt desert, takes its place.

The white surface of the kevir stretches out on the right, and seems to pass westwards into sandy desert, but the farther we advance the narrower the salt desert becomes, until at length only white strips are seen between the tamarisks. We have gradually descended from Tebbes, and find ourselves at an elevation of only 2018 feet.

The details of Kuh-i-margho come into greater prominence, like those of the foregoing hills in shades of light red, no longer light blue as when we first saw it from Rabat-gur and Tebbes. But this is still the colour of Kuh-i-Naibend, on account of its great distance, and the isolated summit stands up in royal beauty, with its silver-white glittering mantle of snow.

Hauz-i-pai-gudar, or "cistern at the foot of the defile," is a name which indicates that the furrow in which it is situated comes from the saddle on the way to Duhuk. Near the cistern is also a well.

At Hauz-i-haji, which is left close to the left of the road, we have travelled 6 farsakh, and the belt of kevir on our right has come to an end, though tiny patches still lie among the tamarisks. Several muddy trenches run out here, and we can perceive that the overflowing rain-water must spread out in thin sheets and swamps. It brings down salt mingled with mud, and therefore the conditions for the formation of kevir are fulfilled. The tamarisks grow sometimes in tall bushes, sometimes quite small on hillocks of humus, 6 to 10 feet high, of exactly the same kind as in Central Asia, and as there with a framework of roots. Such a landscape, studded all over with tamarisk cones, has a very strange appearance, as though the earth's surface had broken out into warts and tumours.

At last the ground begins to rise perceptibly in the direction we are travelling towards the south-east, and therefore we have left the deepest part of the depression behind us, and accordingly must ascend to a boundary threshold if we continue on the same course; in other words we are approaching a water-parting ridge between the Tebbes basin and the great Lut to the south. After the next day's journey westwards we shall have very accurately defined the limits of the Tebbes kevir; we shall have gone round three sides of it, and only the south-western edge will remain to be determined.

The earth-heaps of the vertical shafts over a kanat lie close to one another, at intervals of 23 or 26 feet, and the road crosses an offshoot from this conduit. The oasis of Pervadeh has been in sight for good eyes from the commencement of

193. Pervadeh.

the day's journey, and the nearer we approach the more distinct its palms appear. We come to the outermost fields, march in under the palm trees, and pass a little burch or stronghold with towers and surrounded by huts. Some palms are effectively reflected in a small pool, and before the tents are pitched I have recorded their forms on some plates. A few inhabitants only are visible, besides cattle, asses, camels, and fowls, but not a single dog; these are scarce in this part of Persia.

Pervadeh contains 39 inhabitants in eight houses; they grow dates, wheat, barley, millet, white beet, and cotton, as well as a little fruit. The two hundred camels now grazing in the environs are from Tebbes. The head of the irrigation canal lies at a distance of a farsakh in the hills of Kuh-i-peikuh; its water is salt. But the village has a large *ambar*, which holds rain-water all the year, not drying up before the winter rains come. Snow will still lie on the eastern heights for a month and a half, and will then totally disappear before the great heat commences.

Within and around Pervadeh there are some heaps of small pieces of black lava, with a very glassy surface and particularly fine cellular structure.

Wild sheep, wild asses, and gazelles occur, and in the evenings large packs of jackals approach the village. Snakes, scorpions, and tarantulas are very common.

It is counted 8 farsakh to Duhuk and 16 to Naibend; to Bahabad there is a road which takes seven days. In summer caravans come from Kerman, Bander Abbas, and Khabis with goods consigned to Meshed.

At Pervadeh we had to make our choice between the straight road to Naibend, which takes two days, and a circuitous road to the west, which would take a week. As I wanted to make an excursion into this unknown country I chose the latter.

At eve Kuh-i-margho is clearly lighted up by the setting sun, and the shadows begin to climb up from its foot and cover its flank. A reflection of the rosy evening light hovers over its summit after the glow which gilded its snowfields has faded away. The gleam forms a dazzling background to the white, and up above the blue colour of

the sky prevails. Suddenly a dome-shaped summit flashes up in the middle of the outline of the group, and is conspicuous from its intensely silver-white brilliance, which makes everything else seem dull—ah! that is the moon rising up full and bright, driving the rosy hues of evening before it, and soaring in serene splendour through the dark blue vault of heaven.

194. Palms in Pervadeh.

CHAPTER XLII

THE BAHABAD DESERT

We direct our steps westwards from Pervadeh. Now I wish to win a part of the Bahabad district where no European has ever set foot, except, possibly, Marco Polo. Our twenty camels tramp in a long row out of the village, and march at first over tamarisk-clothed ground just as yesterday. Numerous camel mares are grazing on the steppe with their foals. And then we come again out into the kevir, seldom wet, and usually dry and lumpy like the ground called in Eastern Turkestan *shor*, which crunches and splits under the weight of the camels. After an hour the vegetation becomes rapidly thin, and then barren country lies before us. The ground slopes towards the north-west, to the centre of the depression, and thither point the small furrows we cross, only two of which are eroded to a depth of 3 feet. The height, which at Pervadeh was 2040 feet, has sunk again to 2024. On the left lies the large expanse of driftsand we have already seen at a distance, hiding the detritus slopes of the southern hills, and only permitting the dark crest to rise above the light yellow sand.

We come to the extremely sharply limited sand-belt, and follow closely its base. The dunes are scantily overgrown, but are bound together by the little vegetation there is. Their height is only 23 or 25 feet, but farther in they certainly increase in height. On the right, to the north, lies absolutely sterile level kevir, with a surface so broad that we only just descry the dark tamarisks of yesterday. It is exactly the same country, or more

correctly the borderland between two tracts of different formation that we are already familiar with from the southern bay of the great Kevir between Khur and Cha-meji. As there, so also this kevir is mixed with a considerable proportion of sand next the shore, which now runs for a good distance due WNW.

Occasionally a solitary shrub has ventured down from the top of a dune and has established itself on kevir ground, and farther on we twice pass tamarisks standing in rows at 100 yards from the shore. Here and there appear dry furrows, through which the rain-water makes its way. On the eastern shore of the kevir, where we travelled yesterday, the vegetation was incomparably richer.

At one o'clock the temperature is up to 69.4° in the shade, and as the breeze from the south-west is barely perceptible, it feels burning hot in the sun. What will it be like when there are twice as many degrees of heat? Nevengk takes things calmly, though he is still clad in his thick winter coat; but the black dog is unhappy and whines, and at every shrub he comes across among the dunes he scratches up cool sand. It flies up around him as round the paddles of a steamer, and when he has digged his hole he lies down a minute in the shade, then hurrying off to the next bush which affords a little coolness.

At last we come to the point where we leave this kevir, the edges of which we have skirted during the preceding days, completely circumscribing its area on the map. During the following days we shall have the Naibend hill in view, and not till we have again lost sight of it shall we feel that we are really on the way to Seistan.

We turn, then, off to the left over the sandy belt, which we cross obliquely to distribute the ascent over a longer distance. We leave two huge dune spurs on our left hand pointing north-westwards; their south-western slopes are quite steep, but even these dunes are held together by scanty vegetation. Farther off to the south-west rises still higher sand, regular dunes climbing up the slopes of the hills; there the sand is absolutely sterile, and of the same close, loose, shifting kind as in the dunes of the

195. In Waterless Country, the Bahabad Desert.

196. On the Way to Torosho.

Takla-makan. No roads or paths cross this belt, which is not to be found marked on any map of Persia.

On our route, where the sand soon becomes level, appears thin, dried-up saxaul. The southern end of the lake Ab-i-kevir is visible to the west-south-west from this elevated point of view, but, on the other hand, the Naibend hill becomes less distinct, and at length disappears altogether when we turn southwards towards small hills.

The Seid, our guide, turns straight to the south, and leads the caravan up a very boldly-cut drainage channel, 16 feet broad and 3 feet deep, with a sandy bottom, which shows that no stream passed down it after the last rain. But the sides of the furrow are moist and interlaced with roots, and therefore are able to form vertical walls 10 to 16 feet high. Our pace slackens in the short and sudden bends of the furrow, and sometimes we cross over projections, sometimes pass along the edge of steep walls of sand, where the loose material might anywhere slip down with the whole caravan.

Higher up, the furrow expands to a breadth of 65 feet, and its banks are only 6 to 10 feet high. The bottom is composed of hard, alluvial clay, wrinkled by running water. There must evidently be a heavy fall of rain before the stream can reach down to the point where we first came in contact with this furrow, which shows that the fall of the land is towards the kevir depression. Among the dunes on either side grow saxauls 13 feet high, large as trees. Indeed, one of them was quite 20 feet high, and I had no need to bend my head as I sat on my camel, but we passed clear underneath the topmost boughs of the saxauls.

The furrow, which is called Kal-torosho, expands still more and becomes flat and shallow. The bank consists of pebbles, clay, and sand alternately.

The rest of the day's march led us through very peculiar country, the like of which we had never seen in Persia. The huge accumulations of sand come to an end after remaining for a long distance on the western side of the dale, and in place of it appears solid rock, forming quite a pavement, even on the very bottom of the Torosho

dell. The rocks are grey sandstone, white fine-grained marble, and porous, loose, calcareous sinter. Over their edges trickles a small rivulet coming from Cheshme-i-torosho, a spring of salt-water, but not too bad for camels to drink of it. But it tasted lukewarm and flat, and in the bottom of small, muddy pools flourished a vegetation of slimy weeds. The dale gradually contracts, and at length becomes a hollow way with threatening rocky projections at the sides, and whole beds of reeds and rushes, tamarisks, saxaul, and other bushes. The path rises perceptibly, but is even and the dale is very winding. At one place there is a small expansion where the bottom is covered with sand and the path runs like an avenue between beds of close reeds and tamarisks. Here and there lies a skull or a horn of a wild sheep.

We would have encamped in the dale, but the air was so close and sultry and not renewed by the slightest draught, so I wished for more open ground, and we went on over a secondary saddle, separating our dale from its next neighbour on the west. With 70.5° in the afternoon the heat was intense, and the shadow of a small hilltop afforded a pleasant and refreshing coolness. The new dale was as narrow and crooked as the former, enclosed by hillocks of rolled stones, with a bottom encumbered by sharp-edged pebbles, shrubs, and rubbish. The camels breathed slowly and heavily on the trying ascent—they wanted to be rid of their warm winter coat.

At last we are up on the Torosho pass (3209 feet), a flat and insignificant saddle, from the top of which two similar low ridges can be discerned to the south. A flat depression lies between Torosho and the next ridge.

The road down from the pass south-westwards led through another corridor as narrow and winding as that on the north side. At a distance the Torosho hill looked quite insignificant and harmless, and we could not suspect that it contained such mazes, trenches, and pitfalls. But in fact it is flat, disintegrated and irregular, while the Naibend hill, which now comes again into view, makes a comparatively grand and imposing appearance.

197. The Way to Torosho.

198. The Camp Valley at Torosho.

At sunset we came to an expansion of the valley (2930 feet), where we pitched our tents, tethered the camels in circles round the straw, took out the fowls and gave them food and water, and enjoyed the cool after the heat of the day. At nine o'clock the temperature was only 55.4°, the air was quite still and absolutely clear, and when I had made my observations, ticketed the rock specimens, and written my notes, I went to bed after a working day of sixteen hours.

The thermometer fell to 36.7° in the night, and in the morning of March 12 the air was fresh and cool, and almost all day there was some breeze from the south-west. Of the heavy masses of clouds which lately swept over Iran and brought us so many cooling showers, there was not a wisp as large as a man's hand left, and the crests stood out clear and distinct against the unbroken sky.

I walked on as usual in advance, and soon came upon a comparatively deep pool, the last remnant of a sheet of water from the last rain. The water was cold after the night and quite sweet. If our guide had known that water still stood here, he would have led us to it the night before, and saved us from the bad water we carried in our calf-skins. Now the camels drank as much as they liked, and the supply would have been sufficient for double the number. It is at such natural hauz or cisterns the wild asses and gazelles drink, but when the last drop has evaporated they have to put up with the salt-springs in the hills. A little farther down stood a sweet-water pool in the middle of the bed, and in the shadow of a close coppice of tamarisks which live and thrive in these reservoirs which water their roots for so long.

The brown, hard sandstone occurring here was rich in fossil shells, and the specimens I collected are considered sufficient to determine the age of the rocks.

The farther we descend through the dismal dale the lower the hills on either side become, and resolve themselves into low fragmentary ridges. South and south-west the country is open up to the foot of the next low ridge. I stray off too far westward, but the ring of the caravan bells recalls me to the right course, and we meet again at the

foot of a regular conical mound called Pell-i-tufengi, or "gun-hill," an intimation of the visits of hunters.

Kal-i-Nasir-Khan is the name of an open arena in the valley (2661 feet), which contains two small sheets of kevir, several dry shallow furrows, and an abundance of shrubs and bushes. Tamarisks form regular thickets, and several way-marks are erected of their dry stems, like those in Central Asia. Afterwards, the path ascends gently up a bed of sand, with a bottom in some places wet and treacherous, where it is necessary to see that the camels do not get into yielding ground.

Behind us towers the proud grand Kuh-i-margho, dominating all the country, and all this confusion of small ridges and backs, ruins and fragments of hills which makes the Bahabad desert so different from the wide decided character of the Tebbes depression. We often cross small shallow furrows, and the ground is sometimes white with salt. It is therefore not strange that Sengab-i-lakuri, a natural rock basin at the foot of a knoll, has salt water. It collects water from all directions after rain, and carries the salt down into the ground. The basin is 6 feet deep.

After crossing the small Lakuri ridge we come out again into flat country, where the ground consists partly of muddy flats, but on the whole ascend south-westwards, from which direction a main furrow descends. The country is completely desert, monotonous, melancholy, and bare, akin to the form of desert Persians call *lut*. Before us to the south-west there is something that looks in the sunshine like a point with luxuriant vegetation running out into a silvery white lake. It seems as though we were coming to an oasis, but we soon find that there is only a small dark hilly spur ending in a kevir flat. Here there are no oases, but all is bare and lifeless.

Far to the left the Naibend group is again prominent, a beacon to guide us on our way, a goal of our hopes, where in a few days we shall find juicy palms and good water. Also our old acquaintances, Kuh-i-shuturi and Kuh-i-jemal, are seen in pale shades of pink, with a border of snow against the blue background of the sky.

The flat expanses of kevir show signs of flooding, but

the moisture must be very slight, for only a few living tamarisks are left among a quantity of dead and dried specimens. The spoors of wild asses and gazelles are very numerous, and the hunter who goes in front looks about more sharply, thinking of the 10 tuman I have promised him for a wild ass. But as before the animals keep out of the way.

On the farther side of this flat depression the road leads up a furrow between low scored hillocks of loose clay. Death-like silence, not a bird to be seen, not a trace of man! We march right towards the sun, but it feels less hot than yesterday, though the temperature is a little higher (71.2°), but there is a slight breeze from the south-west. The tents are pitched in a most perfectly desert spot named Ghasemi (3202 feet), where there is no water, fuel, or pasturage.

March 13. Minimum 43.2°, as if the spring were quite passed over and the summer were following immediately on the footsteps of winter. But the sky was covered with a light veil of clouds, thin as the thinnest gauze, and in the morning a fresh north-west wind blew. With 59.7° at seven o'clock it felt quite fresh, and we hoped that this coolness might continue during the day. In consequence of the wind the air was hazy, and Kuh-i-shuturi and Kuh-i-jemal were scarcely visible; Margho and Naibend were indistinct shadows. An hour later the former two had vanished, and the other two were as good as wiped out.

Over rising pebbly ground, slightly undulating, we follow the western bank terrace of a deeply excavated furrow, and our direction is constant towards the south-west. We have still before us one of these small relic ridges, and we come to a gudar or defile which we saw from our camp of yesterday. The higher we mount the looser becomes the material of the road, the camels sink in half an inch, and the dust is whirled by the wind about their feet. On the flat country behind us yellow swirls dance up, thinning out above, sometimes stationary, sometimes moving slowly over the ground. The wind increases, and veers more to the west, and up on my tall camel I am pleasantly exposed to its cooling breath. In spite of the

heat, then, the day brings a suggestion of spring, and we are glad that the days of summer are postponed for a while.

The hunter is far on ahead, and we wonder whether he will unexpectedly turn up with a wild ass under his arm, but he has bad luck and loses his 10 tuman. We are now quite up to Kuh-i-ghasemi, and at its foot our leader suddenly turns off to the south-east and leads the caravan up among a confusion of detestable hillocks with deep ravines between, but then again the direction becomes southerly, when we reach a furrow sloping this way.

All this manœuvre seemed to me suspicious, so I called to the Seid, the owner of the hired camels, and inquired particulars. He then began to poke about among the hillocks as if he were seeking a lost track, and when he came back he assured me that it was all right and that our course would soon turn south again. It was useless to express the least doubt in face of such confidence, and we followed the man as he strode on southwards.

The train moves on extremely slowly, and the ground becomes bad, lumpy, and uneven among the hills, ravines, and terraces, and when the wind at mid-day rises to a gale, the air is compressed in the narrow gullies so that the heavy camels stagger as they advance. To the right rises the main crest of the range, surrounded by a confusion of tangled limestone hills, and it is impossible to acquire a clear notion of their topography. On either side of the large dale we follow, the configuration is much more distinct, an innumerable quantity of low saddles and ridges parallel to our track. The rock, a coarse-grained light red sandstone, dips at an angle of 20° to the west, and hence arise these ridges with the strata cropping out at the top. They are of small height, not exceeding 13 feet, and many barely a foot high. They are conspicuous as a black band on the otherwise grey ground, and when we march southwards we follow the intervals between them. In short, the country is a series of ridges and banks, steep, often vertical, on the east, and with a gentle fall to the west; the interval, or the breadth of the dale, is about 30 feet, often less. At some places

these ridges are deeply cut by furrows from the mountain, and at their bottom grows what meagre and dry vegetation exists. But occasionally we come upon very unpleasant spots, where the sandstone slabs are covered with rattling, moving pebbles, and we struggle up the saddles to pass from one trench to another.

The main crest of Kuh-i-Ghasemi, which at the commencement of the day's march we saw foreshortened, gradually lengthens out as we follow its eastern flank southwards. The rock is bedded as in the small saddles, and so we see the outcrops of the strata running eastwards broken across, and coloured in bands of brown, greyish green, and dark purple; the transverse valleys are therefore very short, steep, and encumbered with pebbles and blocks of stone.

Light white clouds scurried over the blue canopy of heaven under full sail, but in the afternoon they closed up a little, and we enjoyed the coolness, all too short, which sprang up when some friendly cloud passed just between us and the sun. The air became thick, and even Kuh-i-Naibend vanished in the mist.

In the morning we had steered our course towards the mouth of a valley in Kuh-i-Ghasemi, and it was just at its entrance that the Seid turned and led us southwards in the direction of a valley lying still farther south. The Seid walked always in front, leading the party through stony furrows and over sharp-edged saddles. At half-past one o'clock he came back with rapid steps, and very coolly declared that it was quite impossible to make our way through the southern valley. From the point where we turned to the south-east we ought to have proceeded to the south-west; that he remembered quite well, for he had travelled that way twice before. He deserved a good thrashing, but as that would not have improved matters, I let the camels rest, while Abbas Kuli Bek went on to examine the southern valley.

After half an hour the Cossack returns with the information that this dell is impracticable, a precipitous fissure in solid rock. So back we have to march on the old trail, over all the saddles and troublesome staircases

we know only too well, but now have to take in the reverse order that we may remember them still better. We have a strong feeling of being in an unknown land, where even the guide has never found his way. At length we are at the mouth of the valley which we ought never to have left, and then we mount slowly to the flat crest of the range, near which we encamp in the valley at a height of 3763 feet.

We had seen the trail of the hunter going both forwards and backwards, but why had we not met him? Well, when he at length turned up he informed us that he had turned back to warn us that the spring where we were to encamp was dry. Had not the Seid lost his way we should have received instructions from the hunter in time, but now the former had needlessly led us into difficulties, and as a punishment and warning he should receive no pay for the lost day. The 13th of March was of course a critical day.

The poor fowls, which had been tied and shaken up for such a long distance in their basket on a camel's back, fluttered earlier than usual up on to my tent, and there crowded into a close flock. But there was fearful trouble before they could get settled, for each wanted to be the lowest, and while I sat writing my notes I heard them cackling and scratching above my head. The day concluded with a great battle between the dogs. Nevengk was persuaded that my tent and its immediate surroundings belonged to his sphere of interest, and when the black dog ventured too near he seized him by the hair. In the middle of the night I was awakened by another uproar, the squeal of a camel, yells, and shouts, and a camel came prancing towards my tent and pulled up one of its four corner-ropes. Fortunately, I escaped the pole as it fell, but the candlestick and the fowls came down on my head, so I was thoroughly waked up. The tall black stallion had been displeased with a neighbour and had bitten him. I lighted my candle, while the tent was propped up again; the clock indicated ten minutes to twelve, so it was still March 13.

But then there was no silence, for after a while the

ring of bells was heard, when all the camels were led off north-westwards to the spring Cheshme-i-Ghasemi, 3 farsakh off, for they had to be watered. They were to be back early on the 14th, so that we could start in proper time.

However, nothing had been heard of them when I was called at the usual time, and we waited hour after hour; and it was not till afternoon that the clang of bells was heard down the vale, and Meshedi Abbas and the unsuccessful hunter Hassan returned with our fine animals, but the day was lost, and we had to spend another night at Camp 46.

My riding camel is a favourite with all, and especially with me. He comes with solemn, heavy, dignified strides right up to my tent, cleverly avoids with his nose the flick of the tent canvas and thrusts in his great head—not to see how I am or to make sure that I have not run away, but only in hope of getting a piece of bread. And he gets it at once. During the long rides he is quite a companion to me, and causes me much amusement when he tries to snatch the cap off Abbas's head or bites the hough of the camel in front of him. He must take toll of every shrub as he goes by. When the caravan halts a moment on the march he turns his big shaggy head up to me and noses about the skin-bag, in which I have always a scrap of bread handy. And when the store is finished he bites and pulls at the bag to get more. He is fond of sugar and dates, and would soon make an end of our whole supply if he only got a chance, but only small portions are offered him. Sometimes he comes and pushes his head under my arm and wants me to fondle him and pat him on the nose. He does not like to lie down and take up his rider, but when I am well up between his humps, he gets up quickly like a steel spring, and I have to be ready for the jolts if I do not wish to fly over his head.

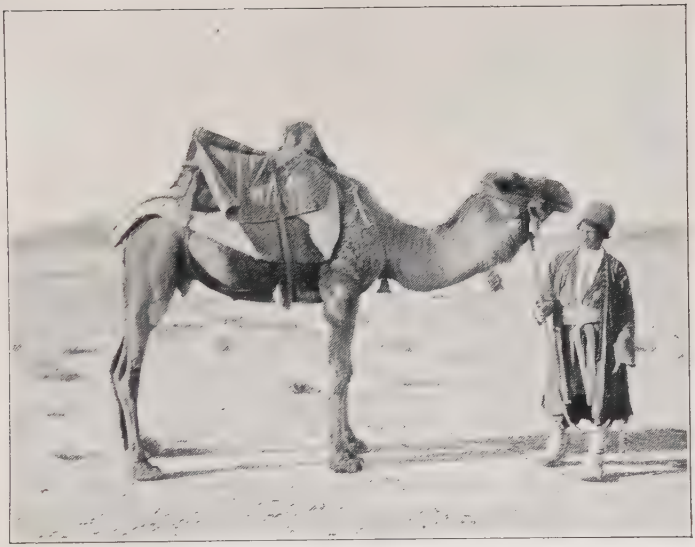
Abbas has led him by the halter all the way from Teheran, and Abbas is the only man who does not ride. It is little trouble to him to travel 1000 miles on foot, for he is accustomed to tramp along the endless caravan

roads of Persia. Abbas himself is an original, a Tatar of Azerbeijan, who does not speak a word of Persian. But he has made pilgrimages both to Kerbela and to Meshed, and therefore has a right to use the titles of honour awarded to pilgrims after visits to the graves of Hussein and Imam Riza. Spite insisted that when he found himself near Meshed he assumed the title of Kerbelai, and that when he was close to Kerbela he preferred the title Meshedi. In our party he was always addressed as Meshedi.

Now he informed us that Cheshme-i-Ghasemi was a poor little spring which trickled forth in a very thin thread. It had, therefore, taken several hours to water the camels, and after all they had not got enough. Two *meshk* had been filled for our use, but the water was both *surkh* and *talkh*, that is, salt and bitter. But as there was no help for it we had to put up with this water.

In consideration of the approach of summer with its heat and insects and the lower and more southern tracts that awaited us, as well as of the long distance that still separated us from Nushki, I decided to give up the journey to Bahabad, which, there and back, would have occupied eleven days. It would also have put the strength of the camels to too severe a trial. Their wool was becoming looser, but they were still as shaggy as in Teheran. If they were overstrained now they would perhaps never bear up against the heat on the borders of the Lut desert.

Therefore I content myself with a survey from the small saddle rising little more than 30 feet above Camp 46. Kuh-i-Ghasemi is properly the name of the range which lies farther north and derives its name from the spring Cheshme-i-Ghasemi, which in its turn is called after some man Ghasem (Kasim). It presents a steep front to the east and to the west gently sloping ridges, and here and there its regular line is interrupted by rounded mounds and cones of loose material. To the south-west is seen a range running NNW. to SSE. called Kuh-i-nakhiya. To the south-south-east the highest elevation is attained by a third range, which seems to be parallel to the other



199. One of the Hired Camels.

200. In Snowy-White Kevir on March 15.

two, and it is between this and Kuh-i-Ghasemi that the road runs to Naibend.

If we then ascend from the small saddle up to the summit of the little ridge, the eastern side of which we followed yesterday, we make acquaintance with a rather deeply eroded furrow in weathered sandstone, limestone, yellowish-grey clay-slate, gypsum, red and black limestone conglomerate, all thoroughly disintegrated and ready to fall to pieces. But the bottom of the furrow is of harder material thrown into sills, basins, flakes, slabs, and hollows grooved out and moulded into fantastic forms by running water. It is astonishing that the hardy tamarisks can in some places suck the moisture necessary to life out of this aridity.

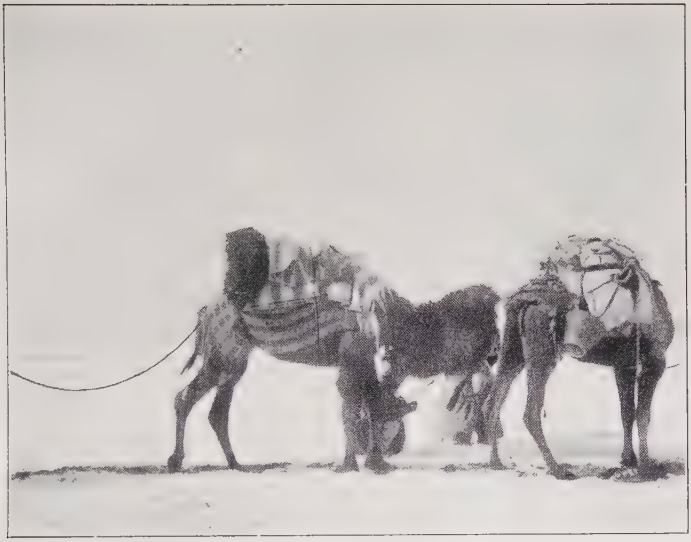
From the ridge itself I had a fine view, as far as the haze permitted, over the dismal landscape to the east. A steep furrow, where an active pedestrian could scarcely clamber down from the upper part, winds in sudden bends between hills and projections down towards the flat country, which vanishes in haze on the eastern horizon, where the hills lying in this direction are quite invisible.

A singular landscape surrounds us on all sides. In the northern coastal mountains of Asia Minor, south of Trebizond and still more in the Caucasus, the earth's crust is in the bloom of freshness, with solid forms, a decided well-sculptured orographical system, a distinct, boldly outlined hydrography and often juicy thriving vegetation. But here from the top of Kuh-i-Ghasemi the eye meets with nothing but ruins and remains of former mountains, degraded weathered folds in the earth's crust, the fissured, cracked, pulverized splinters of older ranges, desiccated, scorched, sterile and wearisome fragments, slight and indistinct signs of ancient highlands. The vegetation is extremely scanty, and is quite lost to view, the brown dry and hard shrubs being of the same colour as the ground. The tamarisks, still struggling for life, hide themselves in the shadows of the furrows which collect the drainage after the infrequent rains. Grey, light green, and red hues prevail, and over the whole lies a dusty haze like gauze, subduing the colours and

causing them to run still more imperceptibly into one another. It is silent as the grave. A raven, which was seen yesterday, has disappeared. Perhaps he lives on lizards which dart here and there among the stones. No wild asses or gazelles haunt this desolate region, where neither man nor beast wanders. But the stillness which accompanies this abomination of desolation is striking, and I enjoy an hour of solitude on the top of Kuh-i-Ghasemi.

I return to the camp by a short cut, where I sink into the finest, almost feathery dust, with gravel swimming, as it were, on its surface and giving way under the feet. This also must be the result of weathering, and the gravel protects the dust from the wind.

The description I was given of the Bahabad road shows that it runs through a perfect desert of disintegrated hills. The name itself implies the most complete desolation. Certainly three wells are to be found in it, but two are salt, while the third is called Cha-i-serd or the "cold well." We therefore lost nothing by giving up this road, and we decided to direct our course to Naibend, the next great stage.



201. A Rest in the Kevir on March 15.

202. The Kevir on March 15.

CHAPTER XLIII

THE DESERT OF ALEXANDER AND NADIR'S THRONE

For the future there is to be a change in our marching regulations, for we are to set out earlier than before, that we may not suffer so long in the heat of the afternoon, and therefore I am called at four o'clock on March 15. The minimum temperature in the night was down to 32.7°, and at five o'clock the thermometer rose only to 36.5°, so that it felt quite cold, and the brazier and warm washing water were needed, and I put on more clothes than usual.

Our guide wanted to go back a good way, but I wished to try a track leaving Kuh-i-Ghasemi on the left, and led the way myself to the south-south-east up and down over hillocks with uncomfortably loose and unstable ground. A small pool stood unexpectedly in a furrow, where the dogs quenched their thirst, but the water proved far worse than that we carried with us. Farther down numerous tamarisks grew in a broad, grassy furrow (3517 feet).

On the right stand the high steep flanks of Kuh-i-chagoki, and to the left the flat slopes of Kuh-i-Ghasemi. We go along a broad isoclinal valley between them, and it is certainly an illusion that the hills on the left seem so much lower. The country is frightfully monotonous. We march for hours along the insensibly sloping furrow, which affords an excellent path, and for hours pass over a plain plentifully overgrown with shrubs.

After six hours of constant travelling we stop for fifteen minutes to eat breakfast and drink water. The bowls are brought out, roghan and bread are distributed, and my camel comes after me to beg for a piece. We have four

more farsakh to a place where we know water is to be found. We march east-north-east; and behind a small hill in this direction there is a *sengab* or stone basin, and yet it proved afterwards that behind this very hill we had to do without water this evening. The shrubs in belts and strips become thinner, and some parts are quite barren. The ground is uncomfortably loose, and therefore our progress is slow and laborious. Rain furrows are very scarce, the rain seems to go right down into the ground, and as it seeps in it carries the finest particles with it. What remains behind is therefore loose and porous.

Farther on, it appears that the three ranges are in *échelon*, and are parallel (NW.-SE.), one following another, but each lying a little south of the next in front of it. A peculiar change takes place in the ground. The plain we have followed hitherto ends in a distinct edge of points and projections with a kevir flat stretching along the foot of it, but the path leaves it on the left hand and enters a belt of extraordinarily close-growing tamarisks in fresh green spring foliage, where the camels become refractory and hard to steer. Here two springs come forth, forming bright, clear brooks, which make the camels increase their pace. It is impossible to hold them back, and they must have their way and convince themselves that this water, so fair in appearance, is bitter and salt. We follow the stream for a time to avoid the close vegetation, and march through an alley between heath and brushwood. There is an odour of fresh spring foliage, but the mosquitoes buzzing in our ears are irritating. It is surprising to find water and verdure in this desiccated land, but our delight is not great, for there is no oasis, only an illusion beguiling and mocking our thirsty party. Out yonder is kevir, which far in the north is bounded by a low ridge faintly visible through the haze. The vegetation soon thins out, and after a belt of shrubs we are out on the salt desert, white as the whitest snow, with which the camels contrast strongly. Here we have come down to 3035 feet.

After the belt of desert we mount slowly among low ragged hills, and after three hours of good marching are told that the *sengab* of our evening camp is not far beyond

203. The Cossacks and the Guide filling our Skins with Water from the Dagemashi Pool.

the small cone for which we are making. The small cone turns out to be a short ridge which we have seen end on, and we travel hour after hour eastwards without seeing any sign of the promised water. The country is quite sterile, and the low ridges of sandstone and clay-slates run on on either side.

It grows dusk, and still we move on eastwards. It becomes dark, and yet the men show no signs of coming to a halt. The hunter Hassan and Hussein Ali Bek hurry on in front, evidently in search of the desired water. The transition from flat clay-ground to driftsand is only perceptible by the gait of the camels and their noiseless steps, and their loads can be heard brushing against saxaul. In the intense darkness we cannot see our hands before our eyes, and the bad-i-Khorasan has brought with it masses of cloud.

After thirteen hours' march we encamped at length at seven o'clock beside two saxaul bushes (3200 feet) without water, for the scouts had been unsuccessful in their search. The locality was called Dagemashi. The supper was a makeshift, and the camp became quiet earlier than usual.

When I went out of the tent in the light of the rising sun, I was struck by the landscape into the lap of which we had come in the complete darkness of the previous evening. Nothing then was recognizable, and I almost wondered how we came hither amid a labyrinth of low dunes, some bound together by full-grown saxaul, others free and composed of yellow driftsand in finely rounded forms, and with the fine markings produced by wind. The sandy area was bounded by low crests on either side, and we found ourselves in a longitudinal valley half a mile wide. The Naibend mountain looked more beautiful than ever, and behind this goal of ours stood a smaller elevation called Chekab.

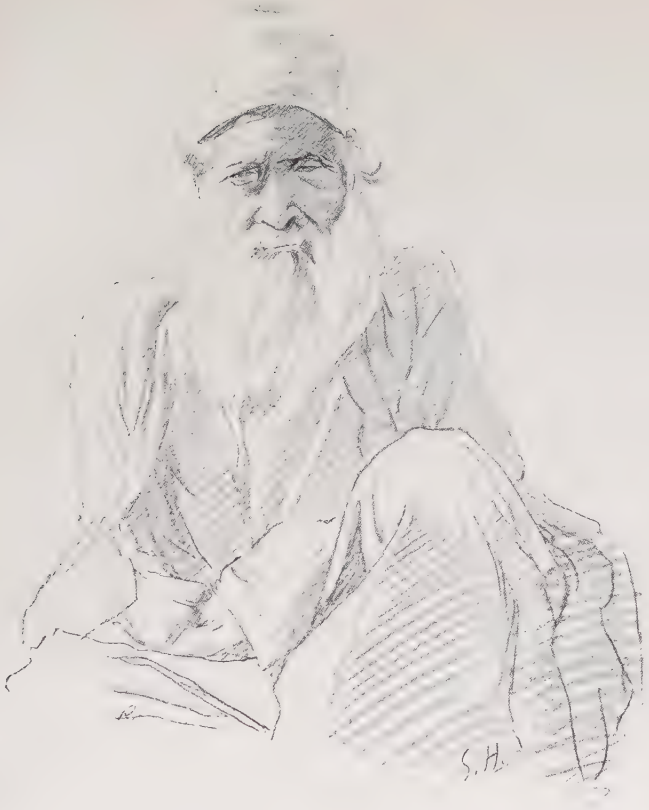
The most noteworthy discovery at this place was made by a camel, which came tramping over a dune and was found to be wet round the nose. By following his trail we came to a pool only two minutes off towards the south, so large that all the population of Persia could have drunk their fill at it. It was 200 yards long by 20 broad,

and seemed to have an average depth of 3 feet. The grey, turbid water was quite sweet, and a stream had flowed from the west through a dry cracked bed into the small hollow begirt on all sides by dune sand and saxauls. They were reflected prettily in the calm surface, at the side of which a covered sheepfold had been constructed of saxaul branches. While the camels drank in slow, sucking draughts, every *meshk* and sheepskin was filled till they lay shiny and puffed out like the carcases of freshly slaughtered pigs. Flies, spiders, moths, gnats, beetles, and scorpions had begun to move about, and the trail of the last was seen in the sand like very fine pricks. It was really sad to leave this delightful spot and the little fresh-water lake, close to which we had been obliged to put up with the salt water we had brought.

Tired with the march of the previous day, I rode all the way, as on March 16 we continued towards ENE., listening, for another day, to the clang of the bells on the endlessly long road through Eastern Persia. A little farther we passed another pool, much larger but shallower, for here and there rooted plants stood up above the surface. Here also begins a length of dune parallel to our track, steep to the south-south-east, 65 to 80 feet high, and quite barren. It cannot move, but is a fixture, and certainly has to thank the prevailing wind and the configuration of the ground for its formation. The hills around are little higher than the sand.

Such is the nature of the ground for some distance until the longitudinal valley widens out, and east and south-east a sandy area extends, called Rig-i-Iskenderi, where the dunes are said to be so high that it is necessary to go round them as far as possible. Here the height is only 2907 feet. Another similar belt in the north-east bears the name of Do-rah-seh-rig or the "three sandfields of the two roads." We have, then, sand in all directions, and before us to the east rises an isolated group of hills named Takht-i-Nadiri. The names of Alexander and Nadir Shah are thus united in brotherly concord, though nearly 2000 years separated the two world-conquerors.

We follow a pathless course with no trace of man and



204. Gulam Riza, 70 years old—Naibend.

205. Takht-i-Nadiri.

no marks to show the way in this dreary clay land, where the driftsand is apparently scattered about capriciously, but really arranged in an orderly system. Hassan takes his chance, and notices all the distant hills he recognizes, whither he thinks he may be able in some way to conduct us. At one o'clock the thermometer marks 70.9°, though the sky is covered with thin clouds; there is a cool breeze from that blessed Khorasan, the air is clear, all outlines and colours are distinct, and Kuh-i-shuturi and Kuh-i-jemal are seen faintly but quite plainly, and I long to see them sink below the horizon.

We force our way through a narrow belt of troublesome dunes, all steep to the south-south-east, turning among them in zigzags, and cutting off points and corners. The camels struggle up their shifting slopes and slip and slide down the other side. But soon the train emerges on to hard ground, which, however, is also tiring owing to the innumerable furrows which start from Kuh-i-chekab, and run on northwards. Such a radiating collection of trenches and ravines converges to a huge furrow which cuts Takt-i-Nadiri or Nadir's Throne right in two. One of them is quite 25 feet deep, and we can only descend into the deep corridor by a steep side furrow, and have a long search on the other side for a way out where it is possible for the camels to climb up again.

In the next ravine we make ourselves at home for the night (2976 feet). Through the gap in the Nadir hill is seen the kevir expanse, whither all the furrows in the district make their way, and in the distance there is a glimpse of Kuh-i-margho, which like Kuh-i-shuturi and Kuh-i-jemal is only an elevation in one and the same chain. To the south-west the low Chekab range stands in deep shadow below the sun. To the north-east rises a hill called Kuh-i-serd or the "cold hill."

The next day's march leads us along the foot of the Chekab hill and over its detritus slope cut up by innumerable trenches, an exceedingly difficult and tiring country. And these trenches, where we have to climb up and down, are sometimes 30 feet deep and 100 yards broad, sometimes small and insignificant, and they are collected into

bunches looking on the map like the branches of a tree. They level down this flat detritus slope, and when it rains volumes of water pour down them to the small isolated kevir basin in the north. The camels fare badly, for their foot-pads are torn by the sharp-edged pebbles of hard reddish-brown or black clinking porphyrite.

At last we come to a cairn, erected by men's hands, and then follow a row of such landmarks. But they do not mark a road, having been erected only by camel herdsmen who could not otherwise find their way to the pastures in bad weather. The air is heavy and sultry, and it is warm walking. The northern hills are quite invisible, the Tebbes hollow and its skirting hills are done with, and new tracts await us in this dismal and forsaken Iran. The belt of kevir shines like a bright white streak, an ice-covered lake in this scorched country, where neither animals nor plants seem to find a refuge. We seem to see the heat around hovering and quivering in the thick sultry air. The dogs fly from one little shade to another, scratching sand cooled in the night from below the steeply eroded banks.

I go on foot to spare my riding camel, but at last I have enough of it, stop in a ravine and wait, for I am a good half-hour in advance. The caravan must go cautiously across the deep ravines, and this wastes time. Mirza seems disgusted with the long walk, and the others chaff him, but when I am on foot no one else rides. It is pleasant to sit again on the camel's back, and the more so because it begins to blow from the south-east. Soon the wind has risen to half a gale, the distant hills are wiped out and the nearer quickly fade away. Cloaks and lighter articles lying loose on the loads are caught by the wind and have to be secured. The wind is right in our faces, and the camel's gait is more than usually unsteady. Owing to the violent wind we do not notice the heat, 74.5°, the highest we have hitherto experienced.

Nadir's Throne, which we have left behind us, again appears foreshortened, and looks like a very small dim hill in the haze, and before us runs a row of hillocks among which we presently find the high road to Naibend, marked

by cairns and showing fresh trails of wayfarers. We follow this road southwards, now through narrow and now through broad valleys, which gradually lead us to higher regions. Long strips of snow hang down from the summit of Kuh-i-Naibend, but in the hazy air everything is faint and subdued.

The camping-ground this day (3829 feet) was chosen in a desolate spot where the camels were let loose to graze on the scanty shrubs. The storm pressed hard against the tents, and drove clouds of dust and sand against our airy dwellings. Two travellers from Arababad passed by in the evening. They were the first we had seen since Fahanunch. We had never been in such forsaken country as the Bahabad desert. Even at the edge of the salt desert we had always met with herdsmen, and caravan routes strike through the great Kevir. But here, in the Bahabad desert — not a soul. At nine o'clock in the evening the temperature was still 65.1°, and the warm, dust-laden wind moaned through the tent-ropes. The sky also was overcast, and the veil of clouds retained the heat on the earth's surface.

Exceedingly tired and sleepy I went early to bed, but lay awake listening to the rain, which began directly after nine o'clock and drummed against my tent in dense, rattling showers. The welcome douche, which continued all night long, and was probably caused by the proximity of the lofty Kuh-i-Naibend, soaked the dry ground, gave new life to the scanty, languishing vegetation, filled the water cisterns, which are so necessary to the regular continuance of caravan life, and would cool and purify the air for the next day. A small ass caravan tripped past in the darkness, its peal of bells ringing gently. Nevengk lay outside, but when he found the weather too wet he crept, whining dolefully, into the tent, usually forbidden him. Though the temperature was 50.7° it felt fresh, owing to the humidity, and towards morning I was glad to draw my skin coat over the blanket.

Even at seven o'clock a shower pelted on the wet tent canvas, and deafening thunder growled in Kuh-i-Naibend. An end of rainbow was strikingly beautiful among the

purple clouds on the west side of the mountain, and with a temperature of 55.8° the morning air was pleasant after the sultry evening.

We go south between ragged hills and across pebbly furrows, and at Cheshme-gezu the camels get fresh water to drink, and this is to be found also in small pools on the road. Fortunately we fall in with a hunter who is well acquainted with the country, and can give satisfactory answers to all my questions. The road leads over the screes, spurs, and offshoots of the Naibend group, and at every saddle or turn in the road our curiosity increases. What will this Naibend be like? Even Persians have much to say of its picturesque beauty. But we are still entangled in this desolate mountain. The ridge on our left is so low that the eye can roam unhindered over its crest and away over endless hazy wastes, where shades and outlines give us a hint of hills and ridges within the domain of the Lut desert. A pure white strip to the east is an indication of the existence of a kevir. We mount extremely slowly over a confusion of sharp escarpments, over deeply excavated ravines and shallow flood-beds, all directed eastwards though we cannot perceive what becomes of them. The hills on the left decrease in height, and the view becomes more extensive over the great lonely desert. The Naibend hill stands clear on the right, and we see the elevation much foreshortened. In this direction, it seems, several small solitary villages lie hidden in the valleys. Even quite close to the road we pass two small palm groves, which make so pleasant an impression in this yellow, red, and black wilderness.

In the hills on the left, on the other hand, there are no villages; for these, says the hunter, are Lut hills, meaning that they are dried up and barren like the desert. He informs me also that there are no wild asses in the Lut, but that one of their resorts is three days' journey off in the Bahabad desert, and it is now vain for me to offer a reward of 10 tuman for one of these mysterious animals which skim like ghosts over the wilderness.

At length we come out of the worst entanglement, and descend a huge trench towards the south-east. The

206. Naibend.

boundless Lut desert lies before our eyes in all its sublime level uniformity, and at 15 farsakh to the south is just perceptible a hill called Kuh-i-murghab, whither all the drainage channels, now dry, run together. We follow this main valley for a long distance downwards, turn to the right, double innumerable spurs and points, and yet again more points in an endless succession, and on the right comes into sight the confused relief of dark hills which are an offshoot from Kuh-i-Naibend. The rocks, of which specimens have been collected during the day, are grey quartzitic sandstone, dark grey slates and greyish-white limestone breccia. The highest point we have reached on the detritus slope was 3900 feet; the lowest in front of the Naibend valley 3327 feet.

Now our direction becomes westerly, and is determined by a small dale, where a small reservoir collects the water of a rivulet. All is dismal and cold. Will this labyrinth of disintegrated hills never come to an end? Ah! wait! Yonder dark green shimmers among the red, there palms peep out in groves and clumps, there at their base lie fresh juicy cornfields. We come nearer, the scene becomes more distinct, and yet it seems rather an apparition, a vision, a mirage, and Tebbes seems poor in our recollections compared with Naibend, where the hand of man in co-operation with Nature has produced an earthly paradise in the midst of this hopelessly desiccated and God-forsaken country. We cross a few more spurs and valleys before we arrive in a large valley, where we pitch our tents in the court of a caravanserai. The height here is 3527 feet.

It is difficult to describe this singular blending of palms, terraced fields, houses perched like swallows' nests on the tops of mounds and ridges, and these openings to valleys and trenches winding about like a tangled skein. As soon as we have encamped I make an excursion up a winding dale between pebble ridges, in the sides of which natural caves serve as stables, and in a moment find myself at the foot of a steep ridge crowned by the fort of Naibend among tall houses and walls hanging like birds' nests over the edges as though glued to the rock, rising up out of it and forming a part of it. The whole scene reminds one of

Ladak and Tibet, where monasteries and forts are usually constructed on commanding points and small mountain pinnacles. And in former times Naibend had every reason to be on its guard. Only thirty years ago the Baluchi robbers were wont to make raids on the village. They came in bands of two hundred, and rode swift-footed jambas, which reached their goal in a day and a half from Abdullahi. They raced like the wind over the Lut by untrodden paths, and came down like a storm on the unsuspecting village. Winter and night were the chief conditions for the success of such a raid, and it is scarcely credible that the little fort on the rock could offer any formidable resistance to the bold and warlike Baluchis.

A winding path leads up the slopes. Here and there a branch runs off to an open donkey-stall only defectively covered with dry palm leaves, or to small flat shelves which serve as roofs to the houses below, and where the absence of a parapet makes walks at night dangerous to arms and legs. In all directions the most picturesque scenes are displayed. At one side, for example, are the perpendicular walls of two houses, on the other, an abyss with palms at the bottom, and far away to the south-east the endless Lut desert. On the west stands the magnificent Kuh-i-Naibend, which we have seen from all directions. On the south its crest is free from snow, and it is only on the shaded slopes that snowfields are still able to defy the increasing heat. To the north, the direction from which we have come, there is that confusion of small horrible hills and ridges, very intricate when one is among them, but in bird's-eye view blending into crests and ramifications.

The rock is equally steep on all sides, and from the east also, where a long grey dale begins, one can climb up to the village itself, a maze of narrow winding lanes and stony paths between square houses and walled-in courts, where asses bray—there are no camels or horses in Naibend. Some paths run close along the edge of precipices. The ground is very uneven, certain parts rising above others, but in the middle of the village there is a fairly level square with a small basin, and there is another at the northern foot of the rock pleasantly surrounded by

207. Boys at Naibend.

palms. In the village itself a green blade is sought in vain. All the verdure is concentrated around the rock, where palms and fields are watered by small conduits.

From the stronghold, a small tower on the extreme eastern point of the rock, the view is immense, and we might be standing on a lighthouse in the midst of sea. On both sides of the rock deep valleys run between dark rugged bizarre ridges, the extremities of which slope down to the low country, and from the mistiness in the distance peep out small dark streaks, islands in the desert sea. The burial-ground lies in the middle of the village with its simple gravestones of mud and stone, and here have been gathered the children of Naibend, generation after generation, ever since it was laid out beneath the palms.

The village consists of 250 to 300 houses with four or five inmates to each, and the palms are said to number about 5000. Wheat, barley, and melons are grown and little else, at least not in large quantities. Like Tebbes, Naibend is isolated, and is in communication with the outer world only by means of small caravan roads of little account. The villagers are far removed from their nearest neighbours.

To foreigners a hasty visit to Naibend repays a journey through the whole of Persia. It reminds one of Yezdikast on the road to Shiraz, but there palms and fresh verdure are wanting. It surpasses Tebbes, where there is no relief in the ground, and though the palms of Tebbes are incomparably more numerous, those of Naibend are much grander, for they stand out against a background of bare rugged cliffs; and nearly everywhere the houses of the village on the summit of the rock look out between the waving fronds, and one cannot gaze long enough on this unique picture.

Here a painter might stay for a year, and every day find a new subject for his brush, and he would return home with his portfolio full of the most wonderful canvases. Now we see Naibend in its spring dress. Soon will come the burning heat of summer with its warm, subdued tones, its air quivering like overheated steam, and its slow lazy life, when men never go out of the door in the daytime

unless they are obliged. And then comes winter, now dark with rain-clouds, now clear and fresh. Then Kuh-i-Naibend, which is now foreshortened and therefore looks like a cone, is sometimes covered with bright white snow in a single night; and when the air clears, the reddish-yellow village and the evergreen palms stand out vividly against the glittering field of fresh-fallen snow, tropical palms against an Arctic background,—nothing can be more charming than such a contrast.

In Naibend the men also are handsome, peaceable, and cheerful, as they ought to be in such a terrestrial paradise. On the whole, they have the appearance of the majority of Persians, and their healthy, purely Aryan countenance and their quiet kindness are the reasons why one is fond of them. Men and youths have a parting in the middle of the forehead and over the crown, and the black hair hangs down at the sides in straight close locks, over the ears and often to the shoulders in a simple, tasteful, and ornamental style. The iris is dark, almost black, the eyes are straight, and the eyebrows are well drawn and not too bushy. The nose is sharply and cleanly cut, the mouth is finely and agreeably formed, the jaw is powerful and the whole face oval and regular. Men are frequently seen with a good carriage and head held up high and gracefully between the shoulders, walking with an easy swinging step, as though they touched the ground as lightly as gazelles. I had an inexhaustible supply of models for my lead pencil, and had to pass over with regret many a finely formed head. But I sat by the hour and drew as many as I had time for. Meanwhile, the others stood round and looked on with silent interest, not noisy and troublesome as elsewhere. As for myself, I was only a bird of passage, which rested a day in this little pearl of oases at the margin of the desert. The youths, whose features I keep in my sketch-books, will grow old and grey, and will not carry their heads as high as now. Each in his turn will be laid in the small gloomy burial-ground in the midst of the village.

Only two of the Naibend people were suspicious of the portrait-drawing. Seated on the large case of my

View of Naibend.

209. House on the Top of the Naibend Hill. Low Ridges and Desert in the Distance.

210. A Shady Palm-Grove in Naibend.

photographic camera in the shadow of the tower, and with the splendid view over the desert around, I was about to draw a boy, when his father elbowed his way through the crowd of onlookers and began a long sermon to all who would listen to him. He considered it highly dangerous for a heathen to draw orthodox Shiites, and he predicted that every one who was drawn would sooner or later become blind. And it did not improve matters, he said, that I asked their names and ages. The boy jumped up and hid himself, while I tried to pacify the father. The portrait should remain in my own possession, and I could very well dispense with the name. The discussion ended satisfactorily, the boy came back, and at last the anxious father allowed me to take his portrait. Another prophet of evil wondered if I were some sort of secret agent of the Shah, and if all those I drew would be forced to join the colours. He opined that in that case they would never see the palms of Naibend again.

Here, as elsewhere, I obtained information regarding all the villages, springs, wells, hills, and caravan roads in the district, and, as in Tebbes, I was somewhat uncertain as to the way I ought to choose. We had to decide on the usual road to Neh, which skirts the northern edge of the Lut, or on a little-known, and now seldom used, way right through the desert. As we chose the former, I will only very cursorily describe the chief points of the latter, as they were communicated to us by the new hunter and guide, Abbas, whom we met with on the way to Naibend.

There are, first, 2 farsakh to Dik-i-Rustem, where there is only a hut and a palm; 2 more farsakh to Araghi, where there are water and palms, but no building to rest in; then 5 farsakh to Puse-i-kal-orkosh at the foot of the hill which constitutes Kuh-i-Naibend's southern prolongation; on this stretch there is true kevir on the left hand, that is, on the east. Then is to be noticed Kuh-i-murghab or the "hill of the birds' water," to which it is reckoned three days' journey. Kuh-i-murghab should be passed on the left; while on the right, that is, to the west, lies Teghmeidan, a level tract of desert with saxaul bushes, to

judge by the name. All the drainage from the north collects at the western foot of Kuh-i-murghab. From this hill there are two days' journey through perfect desert, the Lut, to the hill Kuh-i-bakhtab, and then a day's journey to Abdullahi, where salt water is to be found, and where the Baluchis used to rest when they made their attacks on Naibend. The first inhabited place is Deh-i-salm, a large village, with a hundred houses and palm-trees. Hence there are quite five days of desert to Neh. On the last stretch of road no elevation is seen to the south, but to the north there is Shah-kuh, visible from all parts of the country, and said to be three times as high as Kuh-i-Naibend, an estimate which is of course much exaggerated. But since it is asserted that Shah-kuh, or King's mountain, is covered with eternal snow, it must, however, be an imposing elevation. It is evidently the Kuh-i-Shah of English maps, with a height of 8292 feet.

I was much tempted to make an excursion still farther south into the Lut, but the season was too far advanced, the camels could not go more than two days without water in the now increasing heat, and therefore it would have been cruel to drive them out into the desert. Winter is considered to last only three months in Naibend, December, January, and February, but in the great Lut even the winter is mild, and now we were near the end of March. It is vexatious to feel oneself opposed to insurmountable obstacles, and such are the summer heat and drought in the Lut.

In the evening I lay pondering over new plans for travels in old Iran. I would, some time, visit the Bahabad desert and the land of wild asses, I would cross the Desht-i-Lut and the district round the Niris lake, and many other more slightly known tracts. And I thought of the long years which all this work would require, remembering that I was advancing in years, and that old age comes at last. Life is short and the earth so immensely large.

The wind blew hard from the south-west at eight o'clock, and then it rained slightly and intermittently from the dense clouds. The rain continued all night long, and our

211. The View from the Top of the Village.

212. The Road up to the Village between Palms and Fields.

213. Spectators Perched on a Wall above the Camp.

tents were so placed that they might easily have been washed away by a deluge, but the rain was not so formidable on this occasion.

In the evening the jackals started their mocking serenade, but the dogs, which had now not heard these children of the wilderness for some time, were annoyed and drove them away.

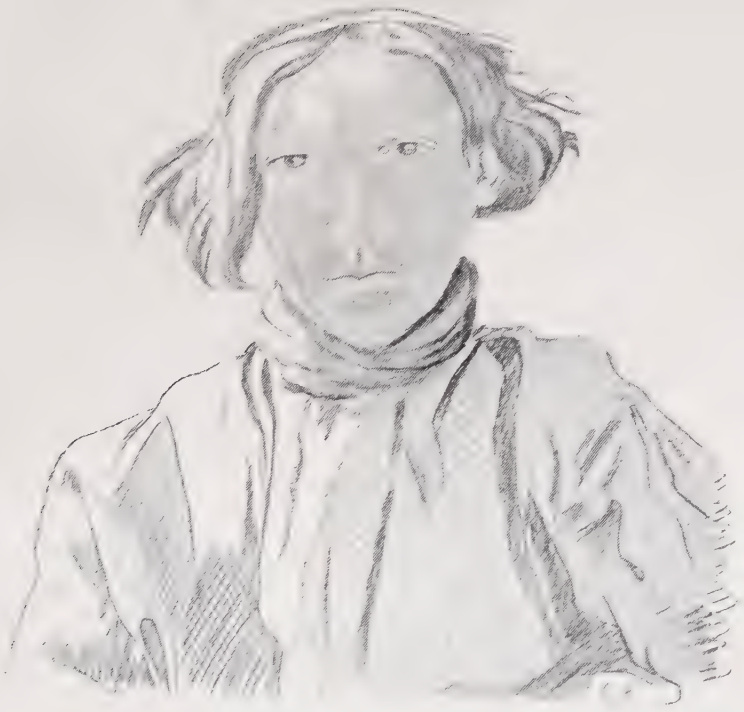
CHAPTER XLIV

FROM NAIBEND TO SER-I-CHA

The Seid from Tebbes, who accompanied us with six hired camels and two at his own charges, agreed to go on with us to Neh; he had been so well paid, and camels could not be hired in Naibend at any price. The caravan, then, consisted of eight men and twenty-one camels, and we had bought provisions for five days' journey. The morning of March 20 at six o'clock felt quite cool, with the thermometer at 58.3°, as we, accompanied by a dense crowd of spectators and beggars, left Naibend and retraced our steps for half an hour, and then directed our course east-north-east on the road to Birjan. But the crowd gradually thinned, and before we came to the small saddle Gudar-i-khur, with a stone cairn erected on its summit, our last attendant had turned back to his cot on the hill above the palms.

To the east appears the hill where our camping-ground for the evening is situated, Shand-Ali-Riza-Khan, and the distance to it is reckoned only 3 farsakh, though it looks much longer. But the Seid asserts that the farsakh in this country is almost twice as long as at Tebbes, and, even if he exaggerated, there was certainly a decided difference.

The air is not clear, being sultry and heavy, with vapour rising from the wet ground in the rapidly increasing heat. The ground slopes slowly from Gudar-i-khur, and we make our way towards a chaos with its farther boundary vanishing in mysterious mist. Poor shrubs stand in strips among the pebbles, struggling patiently for life between



214. Agha Hussein, 13 years old—Naibend.

215. Hussein, 15 years old—Naibend.

the rains. One of the snowy peaks of Kuh-i-Naibend again crops up behind us, and we realize that this mountain will long stand as a landmark on the western horizon, reminding us of the picturesque village which rears its bare walls above the rustling palms.

The road is good and easy, a scarcely perceptible path in the pebbles and clay. It is the great main road to Birjan, and yet all day we meet only two men driving an ass. And hour after hour our bells ring out the same melody which we first heard in Teheran, and has accompanied us day after day for hundreds of miles. Three miles distant to the south-east a small isolated hill rises from the level desert—a reef in the sea,—and farther off gleam white expanses of kevir.

From Hauz-i-kalifá, a rectangular walled basin full of water, our direction becomes due east, and we gradually descend the slopes of the Kuh-i-Naibend group to a drainage channel pointing southwards. The height here is only 2546 feet, and therefore we have descended 980 feet from Naibend. On the other side we again go slowly up. The landscape is fearfully monotonous, silent, and lifeless. The rock which predominates throughout the day is porphyrite of various kinds. The smiling and friendly Naibend disappeared behind us at the first bend in the road.

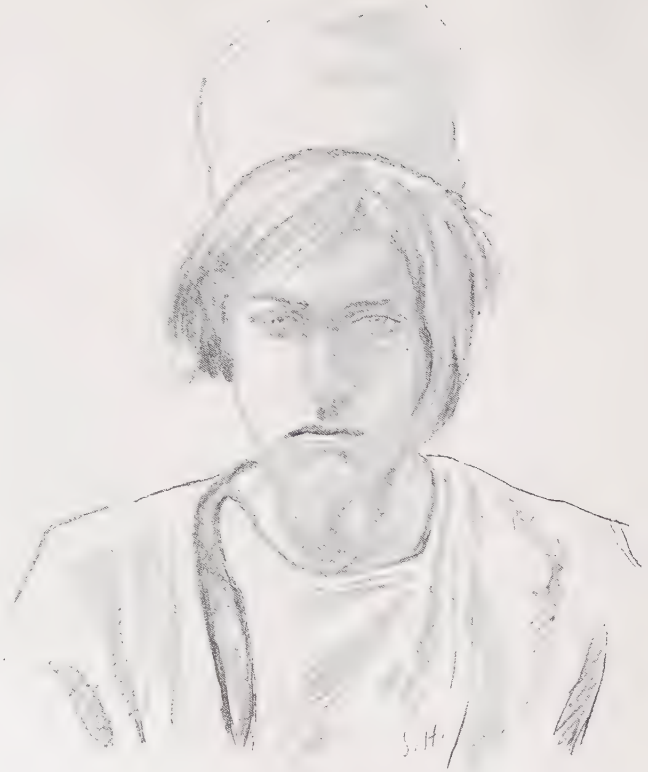
Sometimes the country is quite barren, sometimes overgrown with miserable shrubs, among which a herdsman is feeding his sheep. The great drainage channel is 130 to 150 feet broad where the road crosses, and 3 feet deep. It can be seen meandering down towards Kuh-i-murghab, which is barely visible through the hazy air. The stream passes to the west of the mountain, proceeding southwards to the Nemek-sar, the great salt swamp in the western part of the Lut. In this huge trench, which bears such distinct marks of temporary floods, only a tiny rivulet of salt water is now flowing, which is said to come down from the Kevir-i-ab-i-germ. The furrow itself is called Rud-i-Hanar after a village of this name, and farther on it passes the Kevir-i-Hanar, which shows its white surface in the south.

Scattered weathered ridges and knolls, 70 to 100 feet

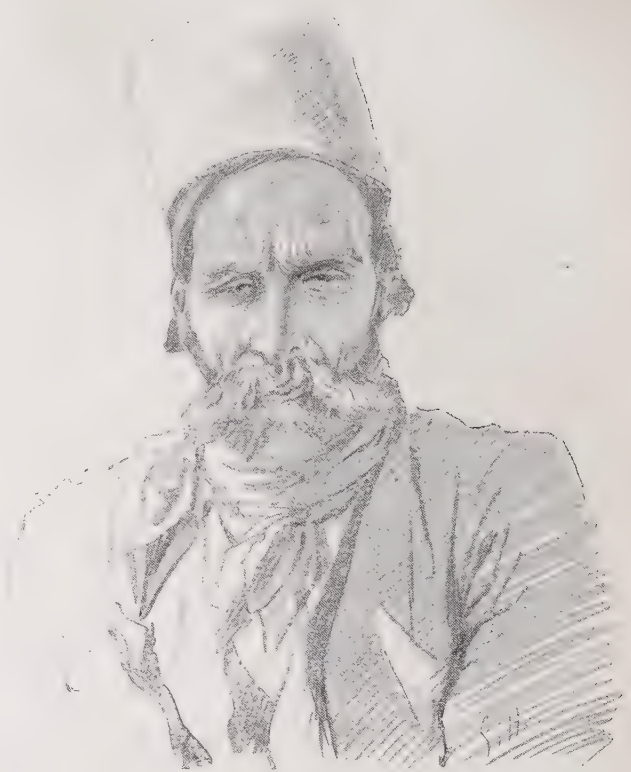
high, carry the path farther to east-north-east. The ground does not support a blade of grass. Another broader furrow is white with salt, and a streamlet is bitter and salt. The camels try the water, but lift up their heads again at once, spluttering, puffing, and blowing with their fleshy lips. The whole region is a salt sewer, a desolate, dismal, dead country. At Tagh-i-Ali-Riza-Khan the camels could indemnify themselves, for here stood a large pool of sweet rain-water. Only a detailed map can give a perfectly clear notion of the country. Here there is no order, no great predominating distinct feature in the configuration and orography. Everything has fallen to pieces; all the hills are weathered away and only fragments and ruins are left —indications and memorials of a former lofty fold in the earth's crust. No vegetation interferes with denudation and weathering; the hills fall asunder into pebbles, the pebbles are pulverized into dust, the dust is washed away by the torrents, filling up depressions and forming sheets of level kevir. Only on the left have we now a more continuous crest of porphyrite,—red-coloured, ragged, and in ruins. It is called Kamar-i-Ali-Riza-Khan. Above it the sky is of a singular yellow, an orange hue, like the reflection of a prairie fire, and a violent gust from the west whirls up the fine dust and soil in vortices and comets' tails, which chase one another over the dry, miserable ground.

At one o'clock the temperature was 76.3°, the highest reading hitherto observed. And yet it felt much less oppressive than lower temperatures in calm air. The wind refreshed us.

And still the camels stride with long, deliberate, and dignified step along the nearly straight track. Their gait is majestic and imposing, and they plant their pads steadily and firmly on the ground. It is only their patience that can overcome the long silent roads of the desert. They seldom turn their heads. They look straight before them, and their fine bright eyes are calm and philosophical. But what do they think about—these heavy toiling giants? Their range of vision does not extend as far as the edge of the horizon. They are only looking forward to the evening camp, straw, and cottonseed.



216. Youth at Naibend.



217. Ali, 55 years old—Naibend.

In the steppe at Shand-Ali-Riza-Khan they are turned out to graze at the foot of a small saddle. Here runs a drainage channel, or *shand*, full of coarse sand, where it is only necessary to dig down 20 inches to find fresh water. I took a view over the country from an adjacent hillock—all alike dreary and disagreeable, all bare and barren, small low hills without order, dark outlines near at hand and lighter and fainter at greater distances. At four o'clock Kuh-i-Naibend was very faint, and a little later it had totally vanished, swallowed up in thick heavy clouds, which discharged heavy showers of rain mingled with hail. With a strong, north-westerly wind, and the thermometer marking 55.4° at nine o'clock, it was cold rather than warm. The height was 2766 feet.

The next day's march leads us through the same desolate country as before, a succession of flat basins, ground falling in general southwards to the Lut, a boundless and little exhilarating prospect. Kuh-i-Naibend shows itself again, and Kuh-i-Ispendiar, which is part of Kuh-i-margho, to the north-north-west. A third prominent hill, lying before us to the east, is called Kuh-i-germab. On the right the great Lut desert is but seldom visible, being usually hidden by low ridges and saddles. The ground is bestrewn with fine pebbles of the same reddish-brown weathered porphyrite which occurs in the solid rock at the sides.

After another saddle the view to the east is unlimited, immense flat spaces opening out in this direction. Some dark specks in the distance resolve themselves, after a considerable time, into two men with three camels. At one o'clock we have only 61.9°, though we are much lower than at Naibend, where the temperature was much higher. But the fresh, north-westerly wind comes from cooler regions.

We march and march, and still seem to be in the centre of the same monotonous landscape, and we tramp over flat undulations like the swell on a sea. The ground is coloured brown, red, and purple by the carpet of pebbles, and occasionally shows a tinge of green where shrubs grow in a low trench. At the sides rise small ridges, dark above and becoming lighter down the slopes, which merge into

the grey tones of the detritus fan, and here and there spreads a flat white surface of salt, or a flat of yellow mud.

The camp was set up in a large drainage channel running south-east, and called Shand-i-shamtuk (2900 feet). As at the last camp, water could be obtained anywhere by digging in the sandy bed. The place is well known to caravans, and one had arrived before us from Ser-i-cha, on its way to Naibend, with a load of barley. Ser-i-cha is a village under the Birjan administration, and the hakim or governor of Birjan had forbidden his subjects to sell grain to their neighbours, in order that the price should not rise in his own district. The caravan, which was now encamping at Shand-i-shamtuk, therefore, was led by smugglers, who made use of desert roads, avoiding the great highway between Birjan and Naibend, which we had now left at some distance to the north.

This day was *norus*, or New Year's Day, and my Shiite servants, that is, the whole party, waited on me in a solemn procession to receive small gifts of silver coin, and wish me a heathenish *eid mobarek*, or a Happy New Year.

March 22. It is so late in the year and yet the minimum temperature was 31.6°, and it is 46.8° at seven o'clock. We clothe ourselves warmly again, for it is not summer here. The men call the cool north wind now blowing *bad-i-bahar* or "spring wind." Perhaps it is characteristic of the season, and is the forerunner of greater warmth.

To the right we leave a gap or portal, whither all the streams in the country converge to pass down to the Lut. Saxauls and shrubs form a steppe here and there, but elsewhere the ground is strewn with pebbles, and is sterile, and splinters of quartzite and flint bear evident traces of deflation. Nemek-sar, or the salt pan, is the name of an irregular kevir flat among the hills. In this country *nemek-sar* has the same meaning as kevir, or salt desert, farther north.

Then we are stopped by a real stream, the Rudkhaneh-i-jangal-i-nakho (2946 feet), with a bed 100 yards broad, containing 50 cubic feet of red, turbid, and bitter running water. On its right bank stands a small long hill, and

218. Hussein Ali, 18 years old—Naibend.

on its left a terrace, the sides of which show the marks of a very high water level, indicating an extensive catchment basin. The bed is still moist all over after the last flood, and consists chiefly of sand or yellow mud. The closely packed mud bears in all parts, but the sand is soft, wet, and treacherous, and Abbas' ass is nearly drowned in a deceptive hole, where he sinks in to his hindquarters, and seems as though he were being gradually sucked down and swallowed by a powerful monster. One of the Seid's camels tries a place higher up, and though he flounders and sinks very deep into the sand, he gets across without further adventures, and we follow his track. The river runs south-south-east, and certainly unites with all the other streams, or rather dry channels, we have crossed since Naibend, to flow in a common bed out into the lowest depression of the Lut. This bed, red, salt, and sterile, is a pit of Erebus, an accursed road to the lower regions.

On the other side our path runs east-south-east, between low dark hillocks. We leave on the right a small pure white kevir flat bounded on the south by a deep black ridge, like a dark blotch on a piece of white paper, a lunar landscape, an image of Hades, without a trace of life or colour. The country becomes ever more desolate, more forlorn, the farther we advance eastward in the Persian desert. And it can scarcely be expected to improve still farther south, except in the oases which are scattered about.

Low tamarisks and saxauls, solitary shrubs and steppe plants, parade occasionally in fresh green verdure and fresh shoots, and these vivid splashes of colour are the more refreshing amidst this perpetual grey because they are so rare.

To the left stands the hill of Germ-ab, which will soon remain behind us; to the right the ground falls in gentle undulations to the south, the country becomes more flat and open, and the small black hills have come to an end. Porphyrite still predominates. Far to the south-west we perceive a double hill, a faint bluish-grey shadow; this is Kuh-i-murghab, and beside it the horizon of the

desert merges into hazy sky. We cross a track, the road between Khabis and Birjan. It seems to be little frequented; the travellers are few who go through Naibend. Somewhat to the right, and beyond Kuh-i-murghab is seen another hill of a duller tone, Kuh-i-derbend, which is considerably higher.

The country rises gently eastwards, and becomes more open and level to the south. In this direction nothing interrupts its fall. We march along the edge of a huge basin, exceedingly flat and shallow, and we have a conception of immense distance, where *jambas*-dromedaries have plenty of room for their rapid course.

The sky is covered with light clouds, long white parallel streaks, airy and thin as feathers and down. They seem to arrange themselves in certain lines in obedience to the wind, while others are round and spiral-shaped, floating in the air like dancers' skirts and elves' veils of thin transparent gauze, and falling into folds and twists with the movements of the wearer. The whole sky is draped with this airy gossamer, which is much too thin to shade the sun.

We rested for the night at a well which is called Gelle-cha, and has briny water. We had again ascended considerably, and were at a height of 3924 feet. A number of camels from the village Bermench were grazing in the neighbourhood. Pointing southwards, towards the interior of the Lut desert, the herdsmen spoke of the Shahr-i-Lut, or "desert-town," the ruins of which are said to extend over an area of 20 farsakh. In the distance they look like a faint wavy line, but on a nearer approach they turn out to be nothing but bare mounds of earth. How many such mythical towns are to be found in the interior of Asia!

The herdsmen lived in a hole, a hollow in the ground with a roof of saxaul twigs and branches. A fairly deep trench cuts through the ground on its way to Kuh-i-murghab. Smaller or large furrows run almost all the day's march to the south and south-west; and we seldom pass over ten yards where there is no drainage channel. The depression of the Lut desert is, like the Kevir, a huge reservoir into which the water collects from all sides.

221. Rogié, 12 years old—Ser-i-cha.

222. SOGHRA, 9 YEARS OLD—SER-I-CHA.

But the rush of water is seldom heard in these innumerable beds, which converge to the lowest part of the hollow. It rained, indeed, fine and close, at 8 o'clock on March 23, but the dry ground showed scarcely any signs of moisture.

It is singular that the summer still fails to put in an appearance. The temperature does not rise above 55°, and it is rather cool and chilly in the south-easterly wind now blowing. The world of ragged weathered hills which surrounded us yesterday has now been swallowed up in a greyish diffused murkiness, and the sky is hidden in heavy threatening clouds.

After an hour's journey over level ground, here and there abundantly clothed with steppe vegetation, the mist and rain grow lighter, and the view is clear along the road, which soon loses itself in a labyrinth of small irritating and tiring hills, a confusion of small ridges, mounds, and dells where it goes constantly up and down. For some time we walk up a furrow 40 yards broad, between red and grey mounds of porphyrite, where also a reddish-brown sandy volcanic tuff occurs. At the foot of the hillocks crystals of salt often lie like fresh fallen snow. We have never been so high as we are now since we left Teheran, and this circumstance, combined with unfavourable weather, explains the unexpectedly low temperature, barely $55\frac{1}{2}°$ at one o'clock.

At the small saddle Bend-i-ser-i-gudar (4590 feet) is a pool of sweet water, where the camels slake their thirst and we replenish the supply in our sheepskins. And then we march on again over the same rough and troublesome country as before, amidst clay slates and porphyrite, all weathered and disintegrated, and over erosion furrows which are now sometimes wet at the bottom from lately running streams. Sometimes the ground bears vegetation, and sometimes it is bare; the tracks of camels and sheep are numerous, but still this country is fearfully desolate and forsaken. In the afternoon it begins to rain again, and the air is so fresh that we prefer to go on foot. How different from the germsir or warm land of Tebbes and Naibend! But then we are on a relatively lofty rise between two depressions.

The spring where we camp this evening is named Cheshme-i-sehesid (4370 feet), and near it stands the hill of the same name. All the running water in this district is destined for a small isolated basin called Nemek-sar-i-chashur, or the "salt-well's salt reservoir," which is bounded on the south by a low ridge. A path leads thither, which is used by small salt caravans, for, it seems, table salt is deposited in the depression. Farther to the south rises a solitary rocky hill, Kuh-i-ombar, and from its southern foot it is said to be quite 4 farsakh to the wide kevir desert.

The country continues to be as monotonous as ever, and we look in vain for an oasis, a caravan, or anything to vary this wearisome desolation. Narrow and insignificant, often smoothed out by storms and rain-water, the path meanders east-south-eastward over grey pebbly slopes scored by furrows and dipping gently to the south, where stand a number of small, barren, weathered ridges parallel to one another and the track. They are dull and dirty in colour, while the hills to the north are decked in brighter hues, red, brown, purple, with a background of blue and white, the sky and the desert. When the clouds become lighter for a time the sunshine plays freely on these bare ridges.

Dizzy and stupid after the long march of yesterday, and the forced labour and the eternal jangle of the bells, I sit dreaming and jolting on my grand camel and examine the dreary country step by step, which is always changing in our immediate vicinity, but remains the same hour after hour in the distance. To-day the temperature has never risen above 52.3°, and a cloak over the shoulders and a bashlik on the head are comfortable. I feel always a great attraction to the unknown parts of the Lut desert, and if this cool weather continues we can make an excursion southwards without danger.

A sign of life at last! Wandering nomads have set up their seven tents by the road. We halt and take a look into two tents. The black tent cloth is thrown over poles arranged in a conical form, and just at the apex an opening is left to allow the smoke to escape. Around the hearth

223. Nomads on the Road between Sehesid and Ser-i-chia.

224. Nomad Tent between Sehesid and Ser-i-chia.

are torn mats of the simplest kind, and there is a circle of rags, cushions, and tatters, a nest of dirt and vermin. By the fire are a pair of tongs, a kalian, two pots for making tea, some dishes, bowls, and bags. Outside are two heaps of fuel, dry bushes and shrubs from the steppe. We buy a sheep and a good quantity of sour milk, which is kept in skin bags, and the transaction is watched by a crowd of barefooted women and ragged youngsters, buzzing like a swarm of bees around us. The young women, these daughters of the wilderness, who like the dry plants of the steppe extract nourishment from the niggard earth, are exceedingly picturesque for all their poverty, and displayed an unabashed boldness never observed among a settled population. They crowded round me, took hold of me, and pulled my clothes about, and were exceedingly interested in the cloth of my ulster and bashlik. They asked if I could give them some turquoises, begged for money, screamed and cackled together, rushed about like wild cats, and made such a noise that at last only flight saved us from this wasps' nest.

So on we went farther eastwards. A small ass caravan was being driven westwards by five men, wearing white turbans, often seen in the extreme east of Persia, and always in Baluchistan. From a new saddle we beheld a change of scene. Flat land sloped down before us and on the right were the same intricate groups of small hills and ridges, while to the north-east rose Kuh-i-Shah, now standing alone and loftier than any other in the country.

Rain commenced again immediately after noon, and was followed by a heavy pattering shower of hail, small white particles like granulated sugar, dancing and hopping over the ground, but quickly disappearing. The camels enjoyed their coolness, but the powder quickly melted on their forelocks. A little village of twelve iliat tents stood at the foot of a mound.

The detritus slope from Kuh-i-Shah falls wonderfully slowly due south, and is crossed only by very tiny furrows. Thin grass of a spring green colour has begun to sprout up here and there, lending the steppe a cheerful appearance. New juicy leaves shoot up from the dry stalks. The

precipitation of winter has done its work, and the steppe will soon awake to new life; spring is the best season.

Innumerable tracks of sheep and cattle are seen all around, for we are in a corner of the country where men live by grazing, not on dates. We are coming to an inhabited place, whither the roads and paths converge. A ruin on the right hand is called Kelat-i-Ali-Riza-Khan, and yonder in front of us the first village since Naibend comes at last into sight.

Ser-i-cha lies on a barren plain at a height of 4167 feet. A more wretched and colourless village cannot be imagined. Its hundred mud houses lie together in a cluster. They have all dome-shaped roofs as in Kerim Khan and Chupunun, for here there is not a tree, not a palm, to furnish timber for the construction of flat roofs. The inhabitants, it seems, number about 800. A small kanat of salt water drives a mill. We ride past fields where wheat, barley, vegetables, and cottonseed are produced, past the burial-ground and an open basin, and finally pitch our tents immediately to the north of the village.

An intelligent man gives me all the information I require about the neighbourhood. He describes all the avenues of communication which meet at Ser-i-cha, and he informs me that the plague has been raging in Khabis for a month past, and that therefore all the roads from that place are closed. Caravans coming from that direction are stopped at 2 farsakh from Ser-i-cha. Wolves, foxes, jackals, and panthers are found in the district, and also gazelles, wild sheep, and antelopes. About fifty hamlets lie more or less distant in the surrounding hills. The nearest own together 2000 camels, which are only kept for breeding, not for caravan work.

I heard about the *jambas*-dromedaries in the country farther to the east and south-east. There was no limit to their swiftness and endurance, and the rider was always tired out before his steed, which, if he is of a good breed, runs lightly and smoothly without jolting. He is fed with barley meal, not with straw and cottonseed, which would make him fat. He must be kept thin and sinewy, and therefore must live sparely.

225. Banu, 15 years old—Ser-i-cha.

226. Nomad Tents between Seiiesid and Ser-i-cha.

And again I was told of the dreaded spider with hairy body and legs. The good men of Ser-i-cha maintained that the bite he gives to wreak his revenge is exceedingly dangerous. If he bites and gets away, and manages to reach a pool of water or a canal, that is, if the spider drinks after the bite, the injured man dies. But if the man catches the spider and kills it the poison loses its deadly effect. Of course this story is only a creation of the popular imagination, and there is no truth in it. I heard it not only here but also in many other places in Eastern Persia and Baluchistan.

We stayed a day in Ser-i-cha, and I had again an opportunity of enriching my portrait gallery with various specimens. Most were young women, and many of them were quite good-looking without being actually handsome. On the whole, the women became less bashful the farther we advanced eastwards, but they could not be induced to remove anything but the veil. The head bandage they would never take off, and therefore it was quite impossible to see a pair of ears. Notions of modesty are different among different people. They showed their bare feet unbidden, even up to the knee, but the ears—never!

CHAPTER XLV

THE ROAD TO NEH

One of our camels, which had borne no load all the way from Tebbes, had, during the latter days, delayed and hindered the caravan, and he was parted with in Ser-i-cha to a dealer who offered us 10 tuman for the beast. The camel had no blemish, but it would have been too much to expect that he, tired and worn-out as he was, should keep up with the others. He had cost six times as much in the first instance, but he had three months of faithful service behind him. It seemed like a slave-dealing transaction to separate him from his twelve comrades, and perhaps he felt like old Uncle Tom when we handed him over. He stood in the open square of the village when we set out, and followed the receding caravan with wondering eyes. What his thoughts were remained his own secret, for we men can hold no communication with animals, but can only torture them. The others did not even glance at the solitary animal, but marched quietly eastwards to the ring of the bells.

We left without regret the miserable village, the most squalid we had hitherto seen, flat and colourless, and with narrow dirty lanes between grey decrepit walls. Even the fort, picturesque in some villages, was here represented by the ruins of a wall. Its moat was filled with salt water, but in summer, it seems, it dries up altogether. Our road passed the village Aliabad with an open pool, where the carcase of a camel lay stinking. The village Ambari we passed out of sight on the left. The ground consisted of yellow clay, often white with salt or made slippery with branches

227. Masume, a Girl in Ser-i-cha.

of a canal—strange that anything edible can be extracted from the soil! But the district seems to be poor. Everything is in bad condition, and ruins and fallen-in canals are frequent. The small villages seem to have a hard struggle for existence, beggars are very numerous, blind men sit crouching by walls and hold out their wizened hands. One is quite willing to give them a copper, poor miserable fellows. In Aliabad the villagers came out to gaze at us, and the women took stolen glances at us and followed barefoot for a while.

All these hamlets stand on an extraordinarily level plain, a flat basin which has been filled up by alluvium. Only where canals extend their ramifications are crops conjured out of the earth, and elsewhere the plain is as barren as the desert. Round about at a great distance is a ring of small ragged hills, seen only in outline, and their connections and configuration cannot be unravelled. Only Kuh-i-Shah rises prominently above the country.

The clay soon ceases, and the soil becomes sandy, and occasionally even small dunes appear. In the village Kerimabad the driftsand is heaped up to the top of the walls facing north-east, 6 feet and more above the ground. To the south-south-west there is an opening between two small hills, and the country beyond seems very flat. Round Kheirabad the fields are turning green, and this village boasts of two fruit trees—a rare sight. But we have not seen a palm since Naibend.

The sky is mostly overcast, but the sun looks through a single small break, and is hot. At times it is burning hot, but when the rift is filled up and the wind blows from the south the air is agreeably fresh. At one o'clock the temperature rises to 60.1°, after having been down to 34° in the night. The sky was indeed clear then, but it is unusual for the thermometer to fall almost to freezing-point at this season in Eastern Persia. Dark-blue rain curtains hang over the hills on both sides of our road, but we ourselves receive only a few refreshing showers, while yellow eddies are seen dancing over the dry plain.

In certain belts the driftsand is heaped up into very low dunes without vegetation. Abbasabad is a declining village

with a population that apparently consists of only two men and some scarecrows in the fields. All the erosion furrows are directed to the south-west; in one of them stands a freshly digged pit full of sweet water, and at the foot of a red mound is Hauz-i-do-dehené (4423 feet), a covered tank, a subterranean water kiosk, filled with splendid rain-water. It is built on the right bank of a main furrow, but is filled from a side dell. A pair of embankments and a canal guide the water right into the reservoir, where it must remain far into spring. The contents of our meshks, the salt water from Ser-i-cha, are quickly thrown away, and four skins are filled with the fresh rain-water. Pure it can hardly be, standing as it does available to all wayfarers. No one passes without stopping to drink, wash, and dabble in the shade. But we do not trouble ourselves, for we have no choice, and are glad to be rid of the nauseous brackish water.

At the well Cha-kuru (4626 feet) we made preparations for another night. When the men's tent was unrolled on the ground a large yellow scorpion crept out of its folds. He had had a ride from Ser-i-cha, and did not like it, but it was all one when his head and poison-bladder had been crushed under stones.

The dog Nevengk has torn soles like my Swedish boots. He is so tender-footed that he can hardly follow the caravan in the morning, and it is some time before he can get along, limping slowly and carefully without running about. As for the boots, they have been fridged and spoiled by the salt and wet in the Kevir. It is therefore not the shoemaker's fault but my own that the soles are worn through.

Our course on March 27 takes us to the south-east, and we have to cross at right angles all the furrows, which here run south-west. Before us are seen the hills Kuh-i-bala, Kuh-i-cheleketau, and Shah-kuh, the first a conspicuous cone, the last at a considerable distance, falling steeply to the north-east and gently to the south-west, and looking like a spike in the outline of the horizon. It is the highest of all that are in sight, and has a large quantity of snow on its northern flank. Kuh-i-Shah disappears behind us, and

229. Banu, a Young Girl in Ser-i-cha.

230. Meësum, 12 years old—Ser-i-cha.

Shah-kuh springs up in front of us. To judge by these names one might suppose that the Persians in this country are very loyal.

At eight o'clock it seems as though the day were going to be oppressively hot, but after two hours the sun is hidden by light clouds, and a refreshing southern breeze springs up —it is like drinking a glass of cold water on a summer's day. Yellow swirls chase one another in the wind on the right of our road, and we can count seven such pillars of dust at one time. They come like yellow phantoms from the desert, and sweep solemnly over the ground. One of them made its way straight over my camel. It came in a spiral like a whirlwind, a cyclone, but I heard its swish in the distance, and could put myself in a state of defence. It raised my rug and buried me in soil and dust, and moved on swiftly, though at a distance it appeared to move very slowly. When it came to the foot of the red hills to the left it fell to pieces and vanished.

For a time we march up a flat, gently rising furrow. Its bed is wet and white with salt, and in places tamarisks grow in abundance. Higher up a little rivulet of salt water trickles down, forming several large pools of water in the bed. Close on the right we leave the lonely, poverty-stricken hamlet Hiret, with its dome-covered huts and its kanat, where we can both see and hear the rippling water below through the shafts 6 feet deep. We have a pass before us, 5184 feet, the highest on the whole journey, but the ascent is easy, and from the top the usual change of scene is observed. We command the landscape to the south-east for a distance of perhaps two days' journey. In three places shepherds and shepherdesses are seen with small flocks. All the day we are amid close, light-grey diabase porphyrite.

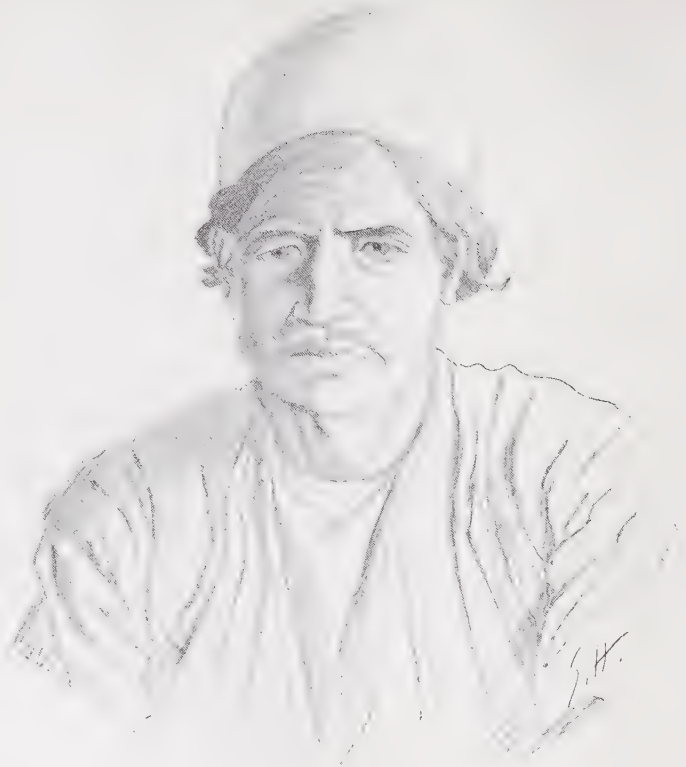
We camped not far from the picturesquely sculptured red hill, Kuh-i-deh-no, at the water tank Hauz-i-hatam (5085 feet), where several nomads were staying. Two old women, hideous apes, came to beg, and had their likenesses taken. A shepherd was watching two hundred sheep belonging to various owners in the neighbouring villages. He said that the people are poor in this district, the soil is

bad, the irrigation water insufficient, the harvests uncertain, and the wolves invincible. There were now three hoary brutes which could not be got at; they carried off twenty or thirty sheep a year. The people cannot afford to keep dogs. If any one has a dog it must be fed on barley meal. The people themselves live on meal, sour milk, and butter. They cannot afford to slaughter sheep. They eat also wild herbs and wander about in summer, living in tents, but in winter they stay in the village Kelat-i-Hassan. Their appearance shows that they are poor and badly nourished, the children are thin and puny, and the country seems to suffer from famine. My informant had travelled to Khabis in six days, and said that when travellers come into the salt desert they must march on day and night, just as in the Kevir, partly that the camels may not have to go too long without water, partly to escape rain and slippery ground. In the interior of the desert there is a belt of salt deposits which in certain strips rises in cross ridges, no doubt in consequence of some lateral pressure in the soft clay. He had never seen any salt lakes, and even the great Nemek-sar contained a thin sheet of water only during the rainy season.

March 28. Beggars spring up like toad-stools from the wilderness, a swarm encircles us in the morning, and we cannot understand where they come from. We believe them when they speak of their extreme poverty and their constant hunger, and we are sorry we cannot help them all. On the day's march also small parties of ragged, dirty beggars turned up on several occasions, begging for help with heartrending voices.

The country is level and open, beside us we have solitary hills and ridges of porphyrite, and all these small elevations scattered about like islands have their individual names. The monotony of the country is oppressive. The only relief to the eye is to observe the development of the steppe vegetation, and it is pleasant to see the ground becoming greener every day. At the hill Kuh-i-rume there was a slight distraction. A camel stallion came up bubbling and gurgling, with all his nose white with foam and the froth dropping from his fleshy, writhing lips. He

231. Elderly Man in Naibend.



232. Riza, a Caravan Man in Ser-i-cha.

233. Rehna, 15 years old—Ser-i-cha.

had winded our stallions from the steppe, and evidently was eager for a fight with them. With lowered head and wildly rolling eyes, he made straight for the largest stallion, led by the Seid, and made ready to throw him to the ground with the back of his neck. But this animal was stronger and quicker in turning, and knocked down the stranger in a moment, intending to finish him off with his forelegs, but the Seid prevented him. The defeated animal had time to get up again, and then he hurriedly took to flight with the dogs at his heels, which considered his conduct unseemly.

At the village Meigon the Seid wished to halt, but, as the place had nothing to offer but two sacks of straw which we bought, we might as well stop anywhere else on the steppe after traversing another farsakh. In the midst of the village stands a ruined fort, and beside it a row of very singular and original windmills. They were not working at this time of year, but a good notion could be obtained of their construction. In the middle of June the prevailing wind from the north-east sets in and continues for two months. It blows extremely regularly, and the mills are built purposely for this direction of the wind which, curiously enough, is different in Seistan not far off, where there is a strong north-north-west wind. The wind, it seems, is strongest at night. There were originally eight mills, but only three were in use, the others having fallen to ruin. Their walls or piers of stone and sun-dried bricks are built so that the wind forces its way in between two of them, and exercises its full strength on three of the eight vertical mill pallets, while the others are on the lee side and do not prevent or retard the rotatory movement. The pallets are attached to a vertical revolving pole with its upper end running in a cross-beam supported by the walls, while the lower sets the movable stone in motion over the fixed one beneath in the millroom below the floor. The contrivance is simple and ingenious, but of course can only be used in a country where the wind blows with the regularity of a trade-wind. The fact that there were formerly eight mills instead of three shows that the production of grain must have fallen off. One cannot suspect a deterioration of the

climate in such a short space of time, or an extension of the desert's domain. Probably with a little good-will the ground might be turned to better use.

The village Meigon has eighty cottages, and outside lie wheat and barley fields; pomegranates also are grown. The irrigation water comes from the hill Kuh-i-shushu, and the head of the canal is situated at a distance of half a farsakh above the village.

A little further is Kelat-i-Sheikh-Ali, a small outlying hamlet of only one hut, surrounded by wheat fields with beautiful spring-green blades. Its pool was full of clear potable water, where the camels had a drink—they were not likely to get more water till evening.

The weather was the finest imaginable, the whole sky was overcast, there was a fresh wind from the south-east, and we could not complain of heat with a temperature of 63.1°. In the afternoon, when heavy, trailing rain fringes hung down over Shah-kuh, the light became diffuse and peculiar, as though we were travelling under a heavy, low roof in deep shadow.

We are in a clearly-marked longitudinal valley more than 12 miles broad, and lying between low ranges. The ground falls between them to the south-east; behind us, to the west, the horizon is hidden by threatening clouds. A hard north-westerly blast with rain and clouds of yellow dust and whirling eddies forces us to hastily pitch our camp near two black nomad tents (4282 feet).

The next day's march takes us farther along the broad longitudinal valley between Kuh-i-bubak on the north and the Shah-kuh range on the south, and our direction is still south-east. The fall is imperceptible to the eye. It can often be detected only by small vegetable fragments floating in the muddy beds, which show in which direction the water runs. The detritus slopes of the two ranges fall exceedingly gradually, at barely two degrees, towards the middle of the valley, where the level ground is occupied entirely by a drainage channel about two-thirds of a mile broad. The side-furrows run in south-eastwards at an acute angle, and thus it is clear that the land falls in this direction.

234. The Camels Drinking from a Trench at Hauz-i-Ali-Shah.

At Hauz-i-Ali-Shah we took a good hour's rest, during which I photographed the caravan from all angles and positions, and also took a cinematograph film. The men took the opportunity of eating a third breakfast, and their appetite was wonderful. Hauz-i-Ali-Shah is a walled, covered-in cistern, and was full of good rain-water. Water was poured from a skin into a trench, where the camels drank. As a rule it is not thought proper to give the sweet water to camels, which can very well hold out till they come to the next well, but for once we broke the rule.

As we were setting out a party of travelling peasants and tramps came up from Seistan with bundles and children on asses. Two of their old women came hobbling slowly along in their wake. They had been twelve days on the way from Seistan, and the crossing of the Hamun lake had caused them no trouble. They were very cautious not to say a word about the unfortunate circumstances in Seistan at the present time which caused them and many others to move into the interior of Persia.

At mid-day there was a peculiar change in the weather. Straight in front of us, in the south-east, the whole horizon became yellow, just as in the Lop desert when a *sarik-buran* or yellow storm is coming on. A huge, yellow cloud, sometimes high, sometimes low and interrupted, came rolling towards us, preceded by comparative calm. After a quarter of an hour we were enveloped in it and the hills beside us disappeared. It blew freshly but not hard, and the whole sky became at the same time overcast. In a short time the squall had passed over the desert, leaving only scattered sand-eddies careering over the ground, like the stragglers of an army on the march. An hour later the same phenomenon was repeated, but this time with greater force and denser clouds of sand, which buried all the country in impenetrable gloom. The sky above Shah-kuh looked dark and threatening, and dark-blue and steely-blue streaks hung down from the clouds, indicating heavy local rain. It was cold in the fresh wind and all cloaks were put on. Thunder growled in the distant hills. What a different climate from that in Naibend, where sometimes we were almost melted by the heat!

We tramp on south-eastwards over this fearfully desolate land, seeing occasionally a shepherd with his flock start out of the yellow mist, or the outline of a nomad's tent beside the road. Chabok is an old ruined caravanserai, with an outlook tower, at the edge of a large erosion furrow.

Again an hour passes and we hear the thunder rumbling nearer and louder than ever. It becomes calm for a moment and then we hear a noise behind us, for the wind has veered round, and again the yellow banks of dust come rolling in a great flood over the steppe. In a couple of minutes a westerly storm is raging, the air becomes cold, yellow, and thick, even the nearest hills are wiped out, the dust races in clouds on both sides of the caravan, the wind pushes on behind, so that the camels can travel more easily. The strength of the wind increases, the camels begin to stagger, and all the country seems to be in motion and rushing about us. The wind tears up the soil and we are almost giddy in this playground of wild, variable, and capricious spring winds. The clouds also are riven in pieces and the shreds trail out in the wind like tattered flags. In some places it looks as if a gigantic besom had passed over the clouds in quick straight sweeps. Only the east seems to be untouched by the wind. There the fine rounded forms remain in light shades of bluish-grey with white edges, strange and translucent as ice, bright as though lighted from within by electric lamps. The heavy rain-clouds have taken possession of Shah-kuh, and come into sight again when the yellow columns of dust have swept by. The moan of the wind is accompanied by the heavy solemn clang of our bells. They are now ringing their last peal, and in a few days their work will be over. They are worn smooth inside by their clappers. What a number of times they have beaten since the day we left Teheran! I listen as usual to the ring of the bell on my faithful and trusty riding camel, and calculate that its clapper has struck the metal at least five million times.

If we thought that the atmosphere would now become calm again we deceived ourselves. At four o'clock a

230. Nâzir.

strong south-easterly wind came again, with yellow dust swirls. The whole steppe was stirred up as before in a cotillon of elves and sprites, and heaven and earth were in an uproar.

We had done enough for the day, and encamped in the midst of the desert half a farsakh from the well Cha-i-sihebal (3652 feet). It was by no means easy to pitch the tents and tauten the ropes in the wind, but pleasant to get at length under cover, and then listen all the evening to the storm roaring like a waterfall outside.

After such a march we slept as soundly as the dead, and I did not notice the squalls in the night. But fresh traces of water were seen in the morning in all the furrows round the camp, and the tents were heavy with moisture. Barely half an hour on the way from the camp the caravan halted to collect fuel in case we should encamp among bare hills. Nomads' tents were seen in several places, and at some of them dogs kept watch.

We advanced eastwards over rising ground, and at eleven o'clock the clouds had piled themselves up in such masses that we could not well escape a thorough drenching. We got it, too, and it quickly developed into a complete cloudburst ; it dashed down with tremendous violence. In five minutes all the furrows were full of water, and it was an unusual sight to see these innumerable, small yellow channels bright with running, purling water-brooks. They meander over the evenly falling detritus slope, turning and dividing and uniting again time after time, and the water is thick and reddish yellow from all the fine solid matter it carries with it. These separate rain storms, which come sweeping over with their bluish-purple, hanging, and trailing rain fringes, have an exceeding imposing appearance. Behind us the country is in bright sunlight, but here the rain comes down in bucketsful over the eastern hills. In the south also the sky is sprinkled with scattered white clouds, and the country is lighted by the sun, but over Kuh-i-bubah and Kuh-i-Neh, to the east, the thunder growls and the lightning flashes follow one another. To the north-west the sky is streaked vertically in a curious manner. Yellow swirls rise from the ground, and seem

to meet the dark rain veil which hangs down from the clouds. Yellow columns, with their bases on the earth; bluish-purple draperies, with their tops in the sky,—no one would credit this picture if it were painted in oils.

The next downpour came half an hour later and lasted twenty minutes, with alternate rain and hail, and again all the furrows were filled with turbid water. When such exceedingly violent deluges are seen over this usually dry and scorched country, the cause of the flatness of the slopes and the even fall is apparent, for the water washes, fills up, and levels all parts. As soon as the rain is over the small trenches are quickly dry again, and the smooth, wet, yellowish red clay lies like freshly painted oil colour in all the beds.

Jolting over the slowly rising steppe, we sit longing for the sun to dry our drenched clothes. At length we come to the foot of the hill which forms a connecting link between Kuh-i-Neh and Kuh-i-esten, and enter a very narrow, barren, very winding dell, a corridor between steep elevations of loose clay, scored and perforated in the most fantastic fashion, and vividly reminding me of Akato-tag, in Central Asia. The red and green clay is now soaked, soft, and slippery, but it has a framework of solid rock in vertical strata, here and there forming sharp upright points and pinnacles. The rocks are partly brownish red sandstone, partly compact white limestone. The vertical strata strike NW. to SE., and when the dale we follow cuts diagonally through the rocks it is very winding, and on our way eastwards we actually turn in every direction. Sometimes the stretches are only 6 feet long. The small, narrow, hollow way is exceedingly picturesque, and before we are aware we are up on a small pass (4285 feet), where the rounded summit is as slippery as soap after the rain. It is called Gudar-i-Khabisi, because a road to Khabis runs over it.

The view is not very instructive, and vanishes as soon as we lose ourselves again on the other side, in a corridor just like the former. A brook comes down from a side valley, the largest we have seen for a long time. In a short time we come again to level ground, and the smooth

238. The Fort at Neh.

239. Windmills at Neh.

clay gives place to steppe of the usual kind. The afternoon is fine, and the rain-clouds fly in all directions from the sun like jackals.

Now the town of Neh is plainly seen in front of us, with its commanding fort. On the left lie green fields. We cross two irrigation canals, one of them with a stone slab for a bridge; skirt extensive tilled fields, which now occupy the ground on all sides; pass the first groups of houses in Neh, and come to rest as usual at the burial-ground near the best canal with drinking water (3924 feet). Not far off is a row of the characteristic windmills we first saw at Meigon.

We camped only just in time, for the tents were scarcely up before the third rain storm of the day came sweeping over the country, first a fresh wind with a velocity of 50 feet a second, and then half an hour of pouring rain, which drove the inquisitive onlookers to flight in a moment. The precipitation is said to be very variable in different years. This year there was abundant rain, scanty last year, while three years ago it had been so heavy that several houses in Neh had collapsed. Rain might be expected for a month and a half longer, but then would come burning summer without a drop. Snow had fallen twice this year. It lies at the most two days.

Neh has 400 houses, 30 shops in the bazaar, and 75 mills. Wheat, barley, melons, pomegranates, apples, pears, grapes, mulberries, figs and cotton are grown. The production of wheat is insufficient for the needs of the place, and must be supplemented by imports from Seistan, whither cotton is sent in return. Dates are imported from Deh-i-salm, an oasis two days' journey distant to the south-west. There, it seems, there are as many as 10,000 palms. For the rest Neh has 200 camels, used in caravans, a score of horses, a few cattle, and 2000 sheep. There are no jambas, or swift dromedaries. Nineteen villages are scattered over the country around, and several of them have gardens.

For the present Neh was practically cut off from Seistan and Khabis, for these places were ravaged by plague. Travellers coming from Seistan had to undergo five days'

quarantine at Bendan, and an Indian doctor examined all wayfarers.

We stayed a day at Neh to make our preparations for the journey to Bendan. Our Seid and his assistant, and the hunter Abbas, received their pay and liberal presents, and were very contented when they set out on their long journey back. Their caravan bells were audible for half an hour, and then the sound died away like a song in the distance.

Here, also, I drew some folk types. I was sitting surrounded by a number of curious spectators and drawing a very pretty young woman, when two mollahs came and sat among the crowd and lighted a kalian. When they learned what was going on they forbade the woman to sit as a model to an unbeliever. But I went up to them, and ordered them, in a tone that brooked no refusal, to go to the devil, and they meekly obeyed my behest.

240. A Child at Neh.

241. In the Hills near Neh.

CHAPTER XLVI

TRAVELS IN THE KEVIR

Marco Polo neither crossed nor even touched the great Kevir, but he passed smaller kevir basins in the northern Lut, or the desert which lies to the south-west of Tebbes. We have to pass over nearly six centuries from his time before we come to the next European who gives us some information of the great salt desert, and this time it is an explorer who describes the desert accurately and fully, namely, the Russian Dr. Buhse, who travelled right through the Kevir in the spring of 1849. Lord Curzon refers to St. John's statement that Buhse was the only European who had ever done this.[1]

In Tomaschek's excellent work we find a general summary of Buhse's journey through the desert.[2] The Arabian geographer Makdisi in the eleventh century has left a very cursory account of the Kevir between Damgan and Jandak, from which we can perceive that the desert was as difficult of access 900 years ago as it is now. Tomaschek uses the characteristic term "daryâ-i-Kawîr," or Kevir Sea. He relates that Buhse found to the south-east of Damgan a basin with a small salt-lake in its midst, and that Alexander the Great, on his last day's march from Hekatompylos to Shahrud, touched on its northern edge. From the western margin of the salt basin a road runs southwards to Frat. Farther south succeeds an expanse of drifts and dunes. The road then

[1] *Persia*, vol. ii. p. 248.

[2] *Zur historischen Topographie von Persien*, vol. ii. ; *Die Wege durch die persische Wüste*, pp. 70 *et seq.*

runs over steppes and hillocks to Rishm, Husseinan, and Mahelleman, the latter situated on the very edge of the desert. "Fortunate the caravan which, after travelling through the dry desert, arrives at this point!"

Dr. Buhse describes the Kevir in the following striking passage, which perfectly accords with the description of the route I have given fifty-six years later:[1] "At Rishm limestone predominates; then follow hillocks of calcareous marl, rich in common salt, and then you go out into the Kevir, where the greyish yellow ground is at first fairly firm. Its principal constituents are: sand (50 per cent), carbonate of lime (16.7 per cent), oxide of iron (6.1 per cent), common salt (5.3 per cent), sulphate of soda (2.5 per cent), clay earth (2.1 per cent).[2] Salt crystals cover large areas. Farther into the desert the salinity increases to such an extent that pure salt occurs in the hollows and holes, and here and there forms large crusts of salt. It is possible only in the dry season to travel through this tract, where the least rain softens the ground and makes it so slippery that baggage animals especially are often lost. It is still worse to go in unfavourable weather through the Deria-i-nemek lying 80 miles from Rishm. But on April 14, 1849, the level ground in this tract was fairly dry. As could be seen in a hole, the underlying salt was about 28 inches thick and the layer of mud covering the salt crust about as deep. In some parts to the side of the caravan route the salt layer is said to be thicker. The breadth of this strip of salt depression, which seems to extend from west to east through the Kevir, may amount to $5\frac{1}{2}$ miles. How far it extends and how far it is connected with other similar formations I could not ascertain. The southern shore is as muddy as the northern. At a small ruined building with a cistern firm ground is first reached again, and the eye is pleased by the appearance of a few solitary plants."

[1] "Die grosse persische Salzwüste und ihre Umgebung," *Deutsche Rundschau für Geographie und Statistik*, Nov. 1892. Dr. O. Quelle of Gotha has kindly sent me this extract.

[2] The specimens of salt, clay, and sand I brought home from the desert have been analysed by Dr. Albert Atterberg of Kalmar and the assistant Erik Jonsson at the Stockholm High School, and those from an earlier journey at the chemical station of Gefle. The details would take up too much space in this book, and must be left for a scientific work.

In a note Buhse states that he heard of a caravan road running for six days' journey from Turut right through the salt desert to Halvan. There the Kevir was said to be 62 to 65 miles broad.

I have been able to prove by my journey from Turut to Khur that the salt strip in the southern part of the desert continues a good way to the east.

In the years 1858 and 1859 a large Russian expedition, despatched by the Geographical Society in St. Petersburg, and under the command of Khanikoff, travelled through Eastern Persia. It passed through the Lut desert from Neh to Kerman, and was in perfect desert before it reached the second camping-ground, Bala-hauz. At this place could be seen some traces of a ruined cistern long left dry. Here the desert bore quite the character of an accursed land, as the natives call it. Not the smallest tuft of grass, not a sign of animal life gladdened the eye, not a sound interrupted the death-like, awful silence but that made by the caravan.

"Grâce à la lenteur de la marche des chamaux, et à la perte de temps que nous éprouvâmes pendant que nous perdîmes la route, l'étage nocturne ne fut que de 25 kilomètres. Après une halte de quatre heures, nous nous remîmes en marche, et nous nous dirigeâmes vers des mamelons dits Kellehper, éloignés de Balahouz de 20 kilomètres, mamelons, qu'on voyait distinctement et qui semblaient positivement fuir devant nous. Ayant devancé la caravane, je m'assis au pied de cette élévation sablonneuse, et jamais je ne pourrai rendre le sentiment de tristesse et d'abattement dont je ne pus me garder à la vue de la lugubre solitude qui m'entourait. Des nuages dispersés voilaient les rayons du soleil, mais l'air était chaud et lourd ; la lumière diffuse éclairait avec une uniformité désolante le sol grisâtre du désert fortement échauffé, et représentait presque aucune variation de teinte sur la surface immense que l'œil embrassait. L'immobilité absolue de tous les points de ce morne paysage, jointe à une absence complète de sons, produisait une impression accablante ; on sentait que l'on se trouvait dans une partie du globe frappée d'une stérilité éternelle, où la vie

organique ne peut reparaître que par suite de quelque bouleversement terrible. On assistait, pour ainsi dire, au commencement de l'agonie de notre planète.

"La seule chose qui nous consolait dans le désert, était la conscience d'avoir marché; les monts Mourghab, qui la veille encore nous apparaissaient à l'horizon comme un brouillard sans forme déterminée, se dessinaient nettement sur un ciel de plomb, et derrière eux s'élevait le mont Derbend, qu'on disait être rapproché de la limite du désert du côté de Yuzd."[1]

Professor A. von Bunge, the botanist of the expedition, furnishes the following valuable description of the same road: "In the night between the 3rd and 4th of April we travelled on camels in the dreadful desert of the Lut, without water or vegetation. . . . A deep and broad river-bed, the Khosrud, where we camped on the first evening at sunset, gave the landscape an almost ghostly appearance. . . . Before the sun rose mirage began to produce its illusions. . . . The country remained still lifeless and dismal, the heat increased from hour to hour, the plain sloped in front of us till evening, and we soon came to the lowest parts, barely 1000 feet above sea-level, where the ground of clean firm salt clay has assumed over extensive areas a peculiar conformation like freshly cleared land, where the large clods have already fallen to pieces; these large flakes are very hard crusts of salt mixed with clay and grains of sand which are, as it were, cemented together by salt clay thrust up from below and probably formerly of a semi-fluid consistency—evidently a salt swamp which has shrunk through long drying, and which now apparently is not converted into swamp even by heavy rain. Beyond these tracts heaped-up mounds of salt clay rise above the plain, not infrequently presenting a delusive resemblance to ruins of colossal buildings, which, especially owing to mirage, assume the appearance of a huge town fallen into decay. These are, perhaps, the shores of the great lake of former times. Between these mounds we came at nightfall to a river with

[1] Khanikoff, quoted by M'Gregor in *Narrative of a Journey through the Province of Khorassan*, vol. i. p. 109.

salt water flowing with a scarcely perceptible current. . . . At last green vegetation could be seen in the distance—scattered tamarisks." [1]

From this description it appears that kevir and lut are different formations only inasmuch as a lut may contain strips and flats of kevir or salt desert, whereas the opposite never occurs. The lowest depressions in a lut desert consist, then, usually of kevir or nemek-sar, that is, salt hollows.

The route of the Khanikoff expedition was well known to the Arabian geographers of the tenth century, and Tomaschek has cited them in his meritorious work.[2] We find from these notices that the country has undergone no marked changes during the long interval, that the desert road is in precisely the same state now, and that Makdisi's description of Khabis accords in detail with that of the later traveller.

On Tomaschek's map of "Die chorassanischen Wüstengebiete," five roads are marked through the Lut desert. The most northerly runs from Khabis through Rawer to eastern Khur, and seems to coincide partly with Sykes's route; the second is Khanikoff's route. The third runs from Deh-i-salm and Bagh-i-azad, to Seif and Khabis, and we have already learned its course. Of the fourth, our knowledge is derived solely from the Arabian geographers, and Tomaschek gives its direction under the title "The road from Narmashir through Deh-i-salm and Neh to Frah."

It is called by the Arabs "the new road." Tomaschek says of it: "From the town of Narmashir it is a day's journey to Daristan: 'this is a village with a clump of palm trees, but without a serai; after this there are no more inhabited places.' After another day's journey Sar-ab is reached: 'it is a spring of water which flows through a ravine.' Thence in four days' journey the whole breadth of the desert is crossed; the road is a real desert track, full of dangers, and the stages are long. At last Deh-i-salm is reached: 'it is a small village belonging

[1] "Die Russische Expedition nach Chorassan in den Jahren 1858 und 1859," *Petermann's Mitteilungen* (1860), pp. 205 *et seq.*

[2] *Zur historischen Topographie von Persien*, vol. ii. pp. 34 *et seq.*

to Kerman, surrounded by extensive plantations (date palms) and fields.' Makdisi adds: 'Near this village there are ruined buildings as far as the eye can reach, in which no one now lives, because the springs and cisterns are dried up; the inhabited village belongs to Kerman.'"

Tomaschek also speaks of a road from Sanig (southern Nasretabad) to Deh-i-salm, which follows the eastern foot of the hills of the basin, and he says that no European has travelled along these two roads, and that only the Arabian authors, Edrisi and Makdisi, throw a light over this *terra incognita* of Carmania.

The road from Bam (Narmashir) to Deh-i-salm is of particular interest. It is not indicated on the latest map of Persia. It is 155 miles long, and only on the first two days' journey can water be obtained. After that it is perfect lut desert all the way. But the most interesting feature of this road is that it runs right between the two salt swamps, which are named on our maps Nemek-sar and Shur-gez, and of which the former collects the drainage from the north and west, and the other from the south. We shall return to this subject later.

The fifth road is the southernmost, and it was well known to the Arabs, who describe it as starting from the town Narmashir for Faraj, the first place on the margin of the great desert, to which it is a short day's journey. Thence to Sanig or Nasretabad it is reckoned four days' journey or 31 farsakh. Edrisi gives the names of the stages. Sanig was a military colony badly supplied with water, and on all sides surrounded by dreary deserts; all the heights and furrows are disintegrated by weathering and dried up, and not a sign of life is to be seen.[1]

This road was followed in the same direction by Sir Frederic Goldsmid's mission in January 1872, and has been described by Major Euan Smith.[2] The caravan for the desert was equipped in Bam. It consisted of 73 men, 138 animals, and 16 tents. The last halting-place before one comes out into the desert, is Tum-i-rig or the "sand-hills," where good water is found. Six inches down in

[1] Tomaschek, vol. ii. p. 28.

[2] *Eastern Persia, an Account of the Journeys of the Persian Boundary Commission, 1870-71-72*, vol. i. p. 245 *et seq.*

the ground there is a layer of hard salt, and this is true of all the road through the desert; very astonishing information, which seems to indicate that the southern Lut is an entirely isolated basin, for the salt sheet of the Nemek-sar lies at a much lower level.

Two resting-places were passed in the desert, Shur-gez and Gurg, with wells 5 feet deep, yielding saline water. At Gurg also the salt stream Rud-i-mahi runs towards the north-west. The road crosses for the most part slightly undulating stony desert, without a sign of life; here and there is a belt of dunes. Two minarets are passed, the first of which is called Mil-i-Nadiri, and is 55 feet high, and the other is in ruins. From these, and the ruins of a fort and caravanserai at Ribat, the travellers concluded that the road was formerly much frequented. The cold was severe in January, but the summer is said to be so hot that a horseman must wind rags round the stirrups that his steed may not be scorched! They heard also of a direct road from Nasretabad to Bam, which could be traversed in twenty-four hours with swift-footed *jambas*-dromedaries.

Next in order comes General Sir C. M. M'Gregor, who, in 1875, crossed the southern bay of the great Kevir between Khur and Tebbes. Among other things he says:[1]

"It is rather difficult to suggest anything that will give an English reader an idea of what this 'Kuveer' is. It is not sand, nor is it in the least like the desolate plains of India, which, burnt up as they may be, are luxuriant in their vegetation compared with Kuveer. It has, speaking quite literally, not one blade of grass, not one leaf of any kind, not a living thing of any sort. It is composed of dark soil, which looks as if it had been turned up by the plough a year before, but which is covered with a thick salt efflorescence, which glitters painfully to the eyes. All round, as far as the eye can reach, there is nothing to be seen but this glare of white. . . . The surface of the Kuveer is not smooth, but is so honeycombed with small holes, about nine inches deep, and the size of a man's head, that it is very difficult walking for animals. . . . Of course,

[1] *Narrative of a Journey through the Province of Khorassan*, vol. i. p. 101.

for small bodies of men, for messengers, for whom adequate arrangements can be made for water, the Kuveer need not be more than an extremely disagreeable feature in a hideously desolate route; but it should never be attempted except with camels."

"When the Kuveer ceased, we came again to sand. . . ." M'Gregor has drawn a number of routes through the Kevir on the accompanying map. Between Tebbes and Sebsevar there is a direct desert road, but none from Khur to Sebsevar nor from Khur to Nishapur. Only two circuitous routes connect these towns. Nor is there any road from Khur north north-east to Biarjarmand(?) The map also shows a direct road from Khur to Semnan, passing through Huseni (Husseinan?); but I have shown above that if such a one formerly existed it is now no longer used. At any rate it never started from Khur, but from Jandak. M'Gregor also visited Tebbes.

In the year 1880, Lieut.-Colonel C. E. Stewart travelled from Trebizond to Teheran by almost the same route as myself, and on from Ispahan through Tebbes to the land of the Turkmans. Only the part of his journey between Ardekan and Tebbes interests us here.[1] Of the great desert he expresses the opinion that it was once the bed of a shallow sea. He refers to the Persian legends, one of which makes King Solomon, with the help of two demons, Ard and Bil, excavate an outlet for this enclosed sea to the Caspian. Another tradition makes the Kevir sea disappear on the day when Mohammed was born.

When the upheaval occurred which drained this sea, this desert still remained considerably below the level of the neighbouring highlands, and the rivers continued to drain into it and formed marshes. Salt was carried into it, and the marsh dried up in summer, but was filled again in winter. In the course of time the ground became encrusted with salt.

He distinguishes between several different forms of kevir, depending on the composition of the soil and the quantities of salt. One type abounds in ridges, as if the ground had been ploughed up. In other tracts horses

[1] *Proceedings of the Roy. Geogr. Soc.* vol. iii. (1881), pp. 515 *et seq.*

sink in, while others again are wet as if water had risen up from below. Persians declare that wicked spirits and demons dwell in the desert, and play all kinds of malicious tricks on human beings.

South of the great bay, between Khur and Cha-meji, is Hauz-i-Shah Abbas, a water-cistern; beyond it, "the desert becomes worse than ever; heretofore it has consisted of solid earth, but here we reach sand-dunes, and the road eads up one and down another, the one so like the other that it is difficult to keep on the right track. . . . The horses sank at every step to their fetlocks, and sometimes to their knees in the loose sand. . . . At last, after six miles of sand, we got to a low ridge of hills."

This is the sand-belt, the northern edge of which I followed on the road to Cha-meji, and of the breadth of which we can grasp some notion, thanks to Stewart's figures.

Stewart visited Tebbes, and says that he was the first Englishman who had been there after M'Gregor. Thence his route runs north-east to Turbet-i-haidari, at some distance from the eastern margin of the Kevir. He communicates some information about the roads through the great desert which he has wrongly interpreted. "From Dasjirdun (Dest-gerdun), which is, I hear, a thriving place, there are roads directly across the desert to both Shahrud and Damghan. This is the desert road from Tabbas to Teheran, and almost all the tobacco which is exported to Teheran is sent on camels by it." When we learn that there is water at every stage, and that one halting-place is called Tahrud, it is not hard to perceive that this road is the one afterwards tried by Vaughan, which runs through Turut. He heard also that the road does not cross the Kevir, but skirts much of it. But by the road from Khur to Semnan or Damgan there is a great deal of kevir.

On Stewart's map of Khorasan, excellent for its time, Kuh-gugird is made double as long as it ought to be, and runs across the desert east-south-east instead of east-north-east to the neighbourhood of Husseinan. More suspicious is the direct road laid down from Chahrdeh, straight through the Kevir and through Turut to Semnan, and the more so that the names of halting-places are inserted on the

the map. Such a way has never existed any more than a direct way from Dest-gerdun to Turut.

Edward Stack, B.C.S., travelled through Persia in 1881. He did not touch on the great Kevir, but he gives observations of smaller kevir basins in other parts of the country. He makes the following reflections on a kevir depression about midway between Lar and Kerman, some of which are very true to nature:[1] "Perhaps it may be well to explain what a Persian *kavîr* is. It is the result of the bareness of Persian mountains and the saline virtues of a Persian plain. The mountains, being destitute of trees, brushwood, or grass, have for centuries been wearing away under sun, wind, and rain; the crumbled rocks extend in long smooth slopes down to the plain, while a long smooth slope rises again to the hills on the opposite side. Such a slope will often be 20 miles broad. The rain and snow of winter, descending from the hills in streams small and great, lose themselves in these porous slopes, and emerge again at the lowest level of the plain, but in a far different shape. The water has become full of salt, and oozes up to the surface in patches of glittering white. Thus a kavîr must always follow the drainage line of the plain in which it happens to lie, and if the plain be a large one, the kavîr may be seen like a white strip stretching away in the direction in which the plain falls, till plain and kavîr are lost in the sky. For the rest, the quantity of water in a kavîr varies at different times and in different places, so that you may have either a mere saline efflorescence on good firm clay, or a salt quagmire in which the laden beast will founder if it strays off the track. . . . The general aspect of a kavîr is utter bareness, unbroken by stone or weed. The smallest object, they say, shows in vastly magnified proportions; if there happens to be a clod on the surface, it looks like a hill."

On his way from Kerman to Yezd, Stack passed through Kuh-benan, Marco Polo's Cobinan, to Bafk. It may be mentioned, by the way, that his map shows a direct road from Kuh-benan to Baghabad (Bahabad). On setting out from Bafk north-westwards he says:[2] "We took two days'

[1] Stack's *Six Months in Persia*, vol. i. p. 175.

[2] P. 245.

provisions and marched for Khan-i-Panj, over 2 miles of drifting sand, where the road is marked out by pillars, then over hard clay, and thence into the kavir. This kavir comes down the whole way from Zarand (Serend). . . . We found it 6 miles broad, a perfectly level tract of salt-encrusted clay. . . . In the middle is a salt stream, . . . we crossed it by a ford paved with stones. . . . Beyond the kavir the plain grows hard and stony, and slopes upwards to Khan-i-Panj."

Abbott had travelled along exactly the same route in 1849, but in the opposite direction. He gives the same description: "Leaving Khaneh-Punj we soon afterwards entered upon an entirely sterile tract, which presently resolved itself into salt kevvir; and at the 7th mile from Khaneh-Punj crossed the nearly dry bed of an intensely salt streamlet which flows through this plain. On approaching Bafk we traversed a sandy tract. . . ."[1] Abbott found the bed almost dry in the middle of December; Stack found water in it at the end of April. January, February, and March are the proper rainy season.

One of Stack's servants had once crossed the great Kevir northwards from Jandak, and he relates his experiences in the following words: "At Jandak they purchased camels and procured a guide, who led them 1 farsakh to an abambar,[2] where they watered their cattle, filled their skins, and entered the kavîr. The guide slipped away at the earliest opportunity, and went home. Their march had begun in the afternoon; next morning the sun rose out of the kavîr, they marched all day and saw the sun set in the kavîr, and it was not till noon of the third day that they arrived in Husainân. The breadth of the kavîr thus crossed is said to be one-and-twenty farsakhs; it is described as genuine kavîr, puffy, full of holes, and dangerous to be trodden, save in the beaten track. . . . In this journey across the kavîr, my informant said the whole party nearly perished of thirst, and his horse dropped dead under him. One of his master's sons died in Damghan from the effects of fright and suffering.

[1] *Journal of the Roy. Geogr. Soc.* vol. xxv. (1855), p. 23.
[2] Evidently Hauz-i-Haji-Ramazan.

Another story of the kavîr may also be related. A caravan was crossing this desert in winter; it came on to snow, they lost their way, and lay down till the weather should clear; and there they were all frozen to death."[1]

In the winter of 1880-81 General A. Gasteiger Khan travelled from Teheran to Bampur, Jalk, and Mashkid by command of the Shah, but his journey added nothing to our geographical knowledge. He confirms the notices of sand-dunes at Bampur, and asserts that the Bampur river contains the same volume of water all the year round. Seven miles (Austrian?) below the town "it completely disappears into the ground like a true steppe river." He calls Mashkid in Baluchistan a last outpost of life and civilization, "for here begins the most desolate sandy steppe, an eternal chaos without end, where every trail is lost and only the initiated can find their way by certain marks."[2]

During his journey in Eastern Persia in 1882 and 1883 Colonel C. E. Stewart crossed a part of the Lut, which lies to the north of my route beween Naibend and Neh, and from his description we gather that this part of the desert is not to be trifled with. He recalls to mind that Sir Frederic Goldsmid's mission to Seistan passed through a part of the southern Lut less inhospitable than this tract, which was crossed by Khanikoff, as I have related above.

Stewart left Birjan on May 25, 1882, a season too far advanced for a desert journey. He speaks of the fearful heat and the desert wind, which was as hot as if it came from an overheated furnace. He betook himself through Khusf to Khur, which is the last inhabited place towards the desert, and says that he chose this starting-point because the desert here is narrower than along Khanikoff's line. The guides said that it was not necessary to take water, as Khanikoff had done, because water was to be found at two places during the first 80 miles. But his guide proved to be unacquainted with the desert roads, and in the end the caravan got into difficulties: "it was impossible to go on, and equally impossible to go back."

[1] Stack, *Six Months in Persia*, vol. ii. p. 10.
[2] *Von Teheran nach Beludschistan*, pp. 102 *et seq.*

When Stewart came to the bed of Shand Ali Riza, where sweet water can be easily obtained by digging, the caravan was in such an exhausted state that "few, if any, of our party could have hoped to escape if we had not been guided to this water." Between Charahs and Yazdun, Stewart also crossed the great desert which lies to the east of Kain, on the borders of Afghanistan, and where I believe that Marco Polo travelled on the way from Tunocain to Sapurgan. In its lowest hollow there is a nemek-sar, or salt lake, named Dak-i-Khurshab.[1]

In the year 1887 Lieutenant R. E. Galindo crossed the western part of the great Kevir between Khur and Damgan. I have, indeed, been unable to find any account or map of his journey, but Lord Curzon, in his monumental work on Persia, gives the following extract from Galindo's report: "Perfectly level ground, at first principally black mud, with isolated patches of white salt and slimy pools of green water. Gradually the salt increases till it becomes a hard, almost unbroken, white crust, still with the green pools standing on it, and looking something like the little pools left by the sea in the hollows of a rocky coast at low water. It is no exaggeration to say that the whole of this track (about 26 miles) is marked out by carcases of camels."[2]

In other places were found few salt crystals or none at all, but "it appeared as if very liquid black mud had been suddenly arrested and hardened while in a state of violent ebullition or effervescence. The ground is thickly pitted and honeycombed with round holes, from 8 to 12 inches in diameter, and generally about the same depth, though some go down 2 or 3 feet. Between these are rounded nodules or ridges of mud, some of which are solid, but some are merely bubbles or blisters of earth, with a thin crust covering a treacherous hole. On the path a horse has to move with slow circumspection, stepping from knob to knob, or he would soon be lamed. Off the beaten track, of course, it is simply impassable."

This description is very apt, and is true for certain

[1] *Proceedings of the Roy. Geogr. Soc.* vol. viii. (1886), pp. 142 *et seq.*
[2] *Persia*, vol. ii. p. 249.

zones of every kevir in Persia. I certainly cannot make out where Galindo travelled. According to Lord Curzon, it was from Khur to Damgan, but probably by an indirect road, for on the straight road between Khur and Turut the kevir is 70 miles broad, not 26 as Galindo gives it. And in the great Kevir men never travel with horses.

Lieutenant Galindo also crossed the great Lut desert twice—in 1887 and 1888—the first time in six, the second in five days, in a country where there was not a drop of water to be found for 120 miles. Lord Curzon gives the following clear and complete résumé of his narrative:[1] "He could not fail to notice the extraordinary resemblance presented by the blown sand to the waves of a chopping sea. These sand billows alternate with bare expanses of black gravel, and with a phenomenon not previously described. This is a region of curious, square-cut clay bluffs, believed by the natives to be the ruins of an ancient city, and called by them the Shehr-i-Lut, but consisting in reality of 'natural formations of hard clay, cut and carved by the fierce north-west wind into strange shapes suggestive of walls and towers.' Lieutenant Galindo found everywhere beneath the sand a substratum of hard rock-salt, some eight or nine inches below the surface, thus proving the saline character of the desert, and here and there patches of genuine *kavîr*, the ground being mapped out in irregular polygons with dividing walls of solid salt, or studded with hard, round, white bubbles of the same material, like a lot of half-buried ostrich eggs, or covered with a sort of moss of delicate-looking salt spiculæ, standing up like needles an inch long, but strong as steel spikes. The worst part of this desert is its south-east corner between Neh and Bam, which is one of the most awful regions on the face of the earth. Here the prevailing north-west winds have swept the sand together, and banked it up in huge mounds and hills, ever shifting and eddying. A fierce sun beats down upon the surface, which is as fiery hot as incandescent metal; and almost always the *bad-i-sam* or simoom is blowing, 'so desiccated by its passage over hundreds of miles of burning desert, that if it overtakes man or animal its

[1] *Persia*, vol. ii. p. 252.

parched breath in a moment sucks every atom of moisture from his frame, and leaves him a withered and blackened mummy.'"

In this extract of Lord Curzon, we recognize all the features of a true Persian desert. It shows also that the great Lut contains patches of genuine kevir, expanses of detritus and flats of clay, where the wind has cut deep furrows and ditches. This is exactly the same phenomenon as I have described in the Lop desert, and which has since been studied by Stein and Huntington.

CHAPTER XLVII

TRAVELS IN THE KEVIR—*continued*

THE great Lut has been crossed, as far as I know, only by three travellers: far in the north by Khanikoff's expedition, more to the south by Galindo, and farthest south by Goldsmid's expedition along the route where the telegraph line now runs between Seistan and Kerman. Between these places lies the largest expanse of *terra incognita* in Persia, occupying nearly 12,000 sq. miles. The next largest is the western part of the great Kevir, with about 9600 sq. miles, and the third is the eastern part of the great Kevir with about 8500 sq. miles. In these three regions there are no roads at all; neither natives nor Europeans have been there.

On the map of Persia already mentioned, which was published in 1897 by the Survey of India, a desert road is marked between Neh and Khabis, and I suspect that this is the road tried by Lieutenant Galindo, from whom Lord Curzon has taken his description. According to the map it is 180 miles long, and turns at right angles from Gudar-i-barut. If only the waterless stretch from Deh-i-salm through Gudar-i-barut to the first water-bed from the Kerman hills be taken into consideration, the length is 120 miles. The map shows the following points in order from Neh: Cha-i-Molla-Hassan, 3730 feet high, two wells with good water; Galu-chakak, 3540 feet, wells with good water; Deh-i-salm, 2850 feet, palms, salt-water; Pushta-i-penj-farsakh, 3180 feet, resting-place; Pushta-i-jagvir, 2350 feet, resting-place; Kal-goz, 1260 feet, resting-place; Gudar-i-barut, 1160 feet—here the channel is passed which

comes from the neighbourhood of Naibend and runs on south-eastwards to the Nemek-sar; Deh-i-seif and Khabis, 1800 feet.

This road is, however, not the only one which connects Neh with Khabis; for during my sojourn in Neh I obtained the following details about another road which comes in contact with the preceding only at one point, Deh-i-salm, but elsewhere lies to the south of it. From Neh it runs first to Ser-i-rig-estendi, 4 farsakh; Cha-turk, 2 farsakh; Hauz-i-ganjigha, 3 farsakh; Deh-i-salm, 3 farsakh. From Deh-i-salm there are 33 farsakh of completely desert country without water to Cheshme-i-deh-i-seif, a distance which is traversed in three days and three nights, with only a short rest every twelve hours to bait the camels; here, then, the journey is accomplished in the same way as we have experienced in the great Kevir. These 33 farsakh were thus described to me: from Deh-i-salm to Daghal, 6 farsakh over easy ground, *desht* or steppe with small plants called *butte-i-shur* or *butte-i-dormun*; Do-shakhel, 4 farsakh over ground of the same kind as before except that a desert-plant called *butte-i-taherun* occurs; on the right of the road, that is, to the north, stand two small isolated hills, which give the place its name; Kuche, 5 farsakh through sand pebbles and clay, but no hills; for half a farsakh the road here runs along a channel excavated by the wind and hence the name, for Kuche denotes a street or lane; Gujar, 7 farsakh over sandy clay soil, which does not become slippery after rain; neither gravel nor vegetation is found here, but a tract of löss clay is crossed which is called Shahr-i-Lut, or, "desert town"; Leb-i-shur-rud, or Leb-i-rud-i-shur, 3 farsakh over kevir; the name signifies "bank of the salt stream" and shows that the Nemek-sar does not extend so far to the north as represented on maps, but that it lies to the south of the road in question, which only crosses the surrounding kevir; Bagh-i-assad, 2 farsakh; here the road seems to touch the Nemek-sar, for my informant said that at Bagh-i-assad salt was broken up into cakes to be carried to Kerman, but otherwise the ground consists here of alternating kevir and hillocks. Then remain 6 farsakh to Ser-i-cheshme-i-deh-i-seif, that is, "the

first spring of the village of Seif." With the exception of a farsakh of kevir the road runs over hillocks and sand. Lastly there are 4 farsakh to Khabis.

Of the whole distance of 51 farsakh, only 5 then are through kevir, and, as it is precisely kevir ground which is formidable to caravans in case of rain, this road between Neh and Khabis is not among the worst through the deserts of Persia. The only difficulty of any account is the transport of water.

This road is 170 miles long, and as the Persians reckon it 51 farsakh, a farsakh here is $3\frac{1}{3}$ miles. The road on the English map is, as stated, 180 miles long, but it wanders off to the north to Gudar-i-barut, which lies at a distance of 6 farsakh from Gujar. This détour is compulsory after heavy rain, which turns the ground about Bagh-i-assad into mud where the camels sink in, and the same is true when the Shur-rud is flooded with water; at Gudar-i-barut it can always be crossed, for its bottom there consists of pebbles and sand which can bear the weight of camels.

The direct road to Khabis runs, then, straight through the Nemek-sar, which on maps is represented as a swamp or a lake. Regarding this, I obtained the following information in Neh. Where the road crosses kevir the salt desert is only a few farsakh broad, but it extends for an enormous distance in a long narrow strip south-eastwards, following closely the whole south-western margin of the Lut basin. Lakes have never been heard of. From Bagh-i-assad the Shur-rud can be seen running on as far as the sight can reach without the slightest trace of a lake. Probably we have here to do with a phenomenon of the same kind as in the salt strips running east and west in the great Kevir. The Nemek-sar is in the dry season a perfectly dry and hard salt crust which is only in the rainy season flooded with water, depending on the volume of the discharge. The Shur-rud, the only stream passed on the way may, it is said, attain a breadth of a hundred paces and a depth of 3 feet, but the volume of water varies considerably in different years.

The caravan traffic takes place only in the cold season,

from the beginning of winter till *norus* (New Year), or during four months. No one travels through the desert in summer, because it is then warm, and therefore it is difficult to carry water. In the lower parts of the desert the heat is deadly to dromedaries. During the summer the kevir ground becomes as hard as stone and quite dry on the surface. It breaks up into slabs and ridges, which are softened by the rain of the next winter and smoothed out again, and this process is repeated year after year. It seems to be due to some expansion in the clay through drying.

The brooks which water Khabis and the villages below it are said to be distributed by a number of irrigation canals, the overflow from which seldom, if ever, reaches so far as the Nemek-sar. It may be possible that after a particularly violent downpour a large flood may find its way to the lowest depression of the Lut.

On the whole, this sharply defined desert basin, which has the form of a triangular bowl, is in a state of far less advanced development than the great Kevir. At any rate it is less filled up with kevir clay. Only the long strip along its south-western margin, which bears the name of Nemek-sar, is flat. It is partly filled with kevir clay, partly with pure salt. Here the height amounts to about 1000 feet above sea-level, while Khabis at the edge of the desert lies at a height of 1800 feet, and the passes in the skirting mountains, according to the English map, rise to 9650 feet. Towards the east the basin rises from its deepest hollow more slowly, as shown by the itinerary described above from the English map. To the north and south-east the rise is likewise very slow.

In the great Kevir we find quite a different form of relief. The process of filling up has proceeded so far that the surface is almost quite level, or at any rate shows only trifling inequalities. The Lut desert is advancing to the same state. Clay and salt are washed down from the surrounding heights in the rainy season, exactly the material which in time forms kevir.

We have to thank Lieutenant H. B. Vaughan for a very valuable and exhaustive contribution to our

knowledge of the great Kevir. He crossed its western parts during various journeys in the years 1888-91, and travelled round the desert everywhere, in some parts twice over. He therefore had better opportunities than any one else of determining the bounds of the desert basin. His conception of its formation, and his explanation of several of its most characteristic phenomena, agree entirely with the observations I made during my journey. As I had opportunities of following other roads than Vaughan's, and also of crossing the desert along two lines, our observations complement each other.

We recognise on Vaughan's route of 1888, between Anarek and Semnan, some of the names I have cited above, as, for instance, Kuh-i-Dom, Chashma Bulazun, Chah-shur, Kuh-i-Tulha, Siah-Kuh, Chah Mesh Mus, and Kuh-i-Gugird. Vaughan went to the south and west of Kuh-i-Dom, I to the north of it. Our routes crossed between Siah-Kuh and Kuh-i-tallhe. South of Kuh-i-tallhe Vaughan crossed a river, the breadth of which at high water he estimated 150 yards and its depth at 6 feet; I found that it had a cross-section of only 8 square feet.

Of the Kevir he says: "This swamp, lying at a low level in the centre of the great desert, receives into its bed the drainage from an immense tract of territory. All the rivers flowing into it are more or less salt, and carry down to it annually a great volume of water. The fierce heat of the desert during the summer months causes a rapid evaporation, the result being that the salt constantly increases in proportion to the water, until at last the ground becomes caked with it. The Persians say that many years ago a sea rolled its waves over the whole of the depression where I am now travelling, and that it was navigated by ships which used to sail from Semnan to Kashan."[1]

From Turut Vaughan travelled to Avel-ahiyá,[2] and writes of the river Kal-mura in the north-eastern part of the desert: "Its banks are thickly covered with green bushes. . . . To the south it runs away into the desert

[1] *Proceedings of the Roy. Geogr. Soc.* vol. xii. (1890), p. 588.
[2] He writes: Abul Haiyea.

towards its unknown destination, its course being marked for a long way by green bushes. Some 40 or 50 miles off it is said to terminate in a vast lake."

The natives asserted that when the sun sets in winter in the south-west, the lake is seen glittering in the sunshine for miles. "Camel-drivers who have lost their camels are said to have followed the river-course in search of them, and have found it to terminate in a salt lake whose farther shore was invisible to the eye."

Of the extent of the Kevir Vaughan writes: "My own opinion regarding the Kavir is that it extends uninterruptedly from 52° 45′ to 57° E. longitude without any break whatever, and that about 54° 15′ its bed is slightly elevated, forming a drier region, across which the road from Yezd to Damghan runs. It contains, I believe, two great depressions, one immediately south and at the foot of the Gugird Hills, the other at the point formed by the junction of the Kal Mura and Kal Lada rivers, both of which depressions pretty certainly contain vast sheets of water in the rainy season."

During his second journey in Persia, in 1890-91, Vaughan was able to further extend his knowledge of the great desert, and complete and improve his former maps.[1] From Linga, on the coast, he went northwards and crossed several smaller deserts before he came to Jandak. Of the wooden door in the fort of Jandak he heard a curious story, that it was made from the wreck of a ship which floated on the prehistoric Darya-i-Saveh that is asserted by tradition to have covered the salt desert. From Jandak he proceeded to Kashan, "to ascertain the southern limit of the salt desert." In this he did not succeed, for he travelled three days' journey to the south of Jandak, and even south of Kuh-i-dom, and, as I have shown above, the southern boundary runs far north of Kuh-i-dom and the other ranges belonging to the same system. He made this détour to avoid "the immense sandhills which fringe the southern portion of the desert in many places."

"Distant on our right lay the Rig-i-Jin (Sands of the Genii), which reach far into the desert, extending, it is said,

[1] *Journal of the Roy. Geogr. Soc.* vol. vii. (1896), p. 24 *et seq.* and p. 163 *et seq.*

to the other side. Natives are very much afraid of them, and will not sleep there on any account, as they are said to be haunted."

Vaughan also heard wild camels spoken of, which were of a whitish colour and used to be hunted, but for about seven years they had not been seen, and were supposed to be extinct. They were said to be the offspring of strayed tame camels.

Three days' journey from Jandak Vaughan came to a sandy desert named Rig-i-Chichagun, with dunes 300 feet high, and an abundant growth of tamarisks.

Accompanied by Captain Burton, Vaughan afterwards visited Khur, and the two travellers came to the conviction that the Kevir, east of Khur, drained to the south. Its absolute height led them to this conclusion, which I was afterwards able directly to confirm, at least for the great bay of the Kevir west of Cha-meji.[1]

From Khur he travelled, in January 1891, to Tebbes following much the same route as Sir Charles M'Gregor. They crossed the large bay, and, therefore, could not tell how far it extended southwards, "as sandhills in that direction shut out the view." Here the Kevir was very uneven, like a muddy road full of deep ruts and footprints, but in places it was also wet. Rain and snow fell in large quantities during this winter. The height was 2130 feet.

Of Halvan, at a height of 2600 feet, Vaughan says that its hundred houses are only protected from being overwhelmed by drifts and dunes by the help of high walls. The sand belt is about $3\frac{1}{2}$ miles broad and ends in kevir, but to the south it expands to a breadth of several miles round Cha-meji.

At Halvan Vaughan found the ruins of an old town of the same name, which is said to have flourished in the time of Zoroaster. As the ruins are buried under sandhills, Vaughan believes that these are recent accumulations, and that the sand has been blown hither from the dry surface of the desert. He notices here the same facts which struck me fifteen years later. "The whole of the northern

[1] Here Vaughan is not quite clear. He says afterwards of the Tebbes' Kevir that he believes it is quite cut off from the great Kevir, as the water flows northwards to the latter. This is also shown by arrows on the map.

border of this desert is absolutely free from sandhills; so is the western one, except near Chah-Shur and the Kuh-Tulha, while on the west and south-western, and partly on the south border, are immense accumulations."[1]

He points out that the eastern sides of the sandhills are steep, the western slopes much gentler. "My opinion is, therefore, that these hills have been formed by the west and north-west, which are the prevailing winds, and that their shape has been modified by the sheets and streams of water which come down from the hills after heavy rain, and give them the appearance of sandbanks which have been thrown up by rivers that have long since disappeared. In windy weather one sees the top of the sandhills smoking, as it were, a dense cloud of sand being thrown off."

His theory of the influence of rain-water on the form of the dunes is, of course, erroneous. Of so much the more value is his statement that there are no accumulations of sand on the northern edge of the Kevir.

From Dasgirdun his road skirted the margin of the desert to Turut, to the west of the hill Kuh-Yak-ab, the eastern side of which Vaughan passed on his previous journey.

He also crossed the Kal-mura, and gives the following account of the mysterious lake into which the river is shown flowing on many maps.[2] Accompanied by Captain Burton, he climbed a mound, and both saw through a field-glass a large lake many square miles in area, "and could see the waves caused by wind." "Next morning there was not a vestige of it visible, and I can only suppose that it was a mirage." He instances other similar mistakes caused by mirage.

Vaughan found the Kal-mura full of water, and flowing rapidly into the salt desert. The river was crossed with some little difficulty. Beyond Turut, Husen-Nun was passed, and Paistun, that is, Husseinan and Peyestan.

Then follows a description of the Darya-i-nemek, "a solid sheet of rock-salt of varying, but in places doubtless immense, thickness. Its area we estimated at 440 square miles, and its elevation was 2700 feet, so that it is higher

[1] His views on the dune belt of the western border are not quite explicitly stated.

[2] As, for instance, in Stieler's *Hand-Atlas*, map 61.

than the central desert." Vaughan does not believe that the Darya-i-nemek drains into the Kevir unless its basin is filled with water to a certain level, when a small shallow stream only a few feet broad flows on eastwards. Where Vaughan, with C. E. Biddulph, crossed the Darya-i-nemek its breadth amounted to 25 miles. On its southern side lies a belt of driftsand, which extends to the neighbourhood of Kashan, and eastwards to Kuh-Yak-ab.

In conclusion, Vaughan sums up his observations of the Dasht-i-Kavir, the name which he considers is in most common use among the Persians. He gives as its limits 51° and 57° E. long., and 33° 30′ and 35° 30′ N. lat. Its greatest length from west to east is, according to him, about 360 miles, and its greatest breadth 150 miles. Its western part is divided by a range containing the hills Siah-kuh, Kuh-i-tallhe, and Kuh-i-sefid-ab.

The desert itself is a depression to which all the rivers from the surrounding country drain, and either lose themselves, or form lakes and swamps. He fixes the lowest level at 2000 feet.[1] The larger part of the desert consists of kevir or sandy soil, strongly impregnated with salt, and has been formed by the evaporation of the water which once covered the depression. The mud is converted by heavy rain into a swamp, which is very dangerous to cross. The salt crust breaks up in the dry season into ridges 2 feet high. In other places immense deposits of salt rock exist of such extent that nothing can break or dissolve them, even when 2 feet of water lie on them after rain. Of such a nature is the Darya-i-nemek, which is said to be passable even when it is under water.

Vaughan cites theories and legends about the former sea which covered the Persian deserts, and mentions that he found oyster shells at a height of 200 feet above the present Kevir bed. The old historians do not mention any lake, but Sir F. Goldsmid assumes that the volume of water in the Persian rivers is now much less than it was formerly. The water is now insufficient to fill the depression. Lakes are formed in certain parts of the Kevir only during the rainy season, which, with a few exceptions, disappear during

[1] I found its elevation to be 2247 feet.

the summer. The desert has not a single general depression in its midst, but several separated basins, one of them being that into which the Kal-mura enters to form its swamp. He believes that the streams of Kal-dasgun, Kallada, and Pir-hajat also form such sheets. Furthermore, he believes in the existence of salt swamps south of Kuh-i-gugird and in the middle of the Rig-i-jin, where he says he saw a large sheet of water in September 1890. Vaughan found that Kuh-i-gugird, which starts from near Siah-kuh, runs through the whole desert up to Husseinan, and so he depicts this low range of hills on his map. This ridge, then, skirts on the south the kevir basin, which is situated south of Semnan, just as low hilly country bounds the kevir basin, to which I made an excursion south of Gushe in the year 1890.

In May 1891 Vaughan followed the river of Ispahan, the Sende-rud, to the salt lake into which it discharges, and which is called Gar-khaneh, or "abode of cows," owing to the excellent grazing. He says that the lake is 25 miles long from east to west, and 20 to 30 from north to south. Three shore lines are discernible at heights of 8, 6, and 1 feet respectively. Between the last and the present water-line is a belt 30 feet broad of soft yielding clay. The lake is very shallow and the water excessively salt. Its southern part is said to dry up in summer, when large sheets of salt are exposed. The northern part seems always to hold water. Vaughan correctly points out that in this lake is observed an intermediate stage through which the great Kevir has passed.

During my sojourn in Ṭurut I collected a quantity of details about the road I should have to take eastwards round the great Kevir, in case I was prevented by rain from travelling through the salt desert to Khur. I repeat them here, for one reason, because most of the names given me are absent from Vaughan's maps in the *Geographical Journal*, which may indicate that several roads run along the margin of the desert, and only touch one another at certain springs. Avel-ahiyá is identical with Vaughan's Abul Haiyea, Gudar-i-dobor with his Chashma Dubor, and Dest-gerdun with his Dasgirdun.

The twenty points on the road from Turut are as follows: Malhe, a place with camel pasturage; Dervas, a salt spring with grazing ground; Bunab, a salt spring; Majera, a hamlet of three houses, with a sweet spring; Avel-ahiyá, a sweet spring with pasturage; Germ-ab, a sweet well with pasture; Sitel, a sweet spring with pasture; Cha-hek, a sweet well with grazing; Gelle-cheshme, a sweet spring; Cheshme-i-shuturi, a sweet spring with a nomads' camping-ground; Gudar-i-dobor, a well of sweet water with iliats, nomads, of Baluchi race; Neëni, a sweet spring with a nomad camp; Kal-i-saus (sebs), a stream with sweet water in winter, dry in summer, a nomad camp; Cha-pusé, a sweet water well; Kal-i-lader, a sweet spring with grazing for sheep and camels; Cha-gulli, a sweet spring with pasturage; Cha-i-kebir, a hamlet of ten houses with sweet water; Dest-gerdun, a village of 200 houses; Shir-gesht, a hamlet with ten houses; Chahrdeh-i-Tebbes, and Tebbes.

The whole road runs along the foot of hills where springs gush forth. In general it is 4 to 6 farsakh from the edge of the desert, sometimes only two. It crosses no offshoot of the Kevir, but has always the salt desert on the right hand as one goes southwards. At Cha-pusé the Kuh-i-yakh-ab, or "icy water hill," is on the east, and on the west Kuh-sefid, or "white hill," which is said to be very high, covered with snow in winter, and visible from Turut in clear weather. Near Tebbes there are hills on both sides. Kevir-i-Turshiz, situated farther east, is quite cut off from the great salt desert, which also has different names, Kevir-i-Jandak and Kevir-i-Halvan, for instance. Kevir-i-Bajistan on Vaughan's map is evidently a part of the Kevir-i-Turshiz.

Kal-mura is a river which carries water after rain, and runs out into the Kevir. Vaughan believes, as we have seen, that this river falls into a large salt lake in the Kevir. Kal-i-germab is said to be a river coming from Kuh-i-dushakh in the north-east, and in some years to close the caravan road between Turut and Tebbes for two months in winter. It becomes dry in the middle of May and can also be crossed in winter if there is no rain for a time. At that time, in the beginning of February, it was said to be

impassable in consequence of the abundant rain that had fallen during the past days. Its bed is said to be 12 fathoms broad where the road in question crosses, and it is evident that large volumes of water are carried down this way to the Kevir during the rainy season. Vaughan mentions no Kal-i-germab, but a Kal-ladu running farther south. From his description it seems to me that the Kal-mura and Kal-i-germab are identical, or possibly delta arms of the same river. The latter is said to disappear in the Kevir 4 farsakh below the road without forming the smallest lake, and such a sheet of water never comes into existence, however much the river may be swollen. In this respect my information differs from Vaughan's, but it is probable that the water in rainy years forms shallow temporary salt lakes. Again, the Kevir below the mouth of the Kal-i-germab is said to remain moist and muddy till the middle of June, but afterwards to stand dry throughout the summer.

From Turut a caravan road leads in five days to Shahrud, crossing a narrow strip of kevir which is never an obstacle to traffic, as it can at the worst be passed round. The distance between Damgan and Turut is about the same. To Semnan also and Sebsevar there are direct roads from Turut.

Nasr-ed-din, Shah of Persia, wrote a short noteworthy article about the Hauz-i-sultan, beginning with the words: "The lake which has appeared between Ṭeheran and Ḳom is the lake Sâvah, of which mention is made in history, and which dried up about 1357 years ago, on the day the prophet—may the blessings of God be upon him and his posterity!—was born."[1] Consul-General A. Houtum-Schindler has added very valuable notes to this composition. The Shah believes that the lake is formed by water which bubbles up like a fountain from the ground of the Kevir. But Houtum-Schindler reports that in the year 1883 part of the embankment on the left bank of the Kara-chai below Pul-i-dellâk was washed away by high water, so that an arm of the stream sought a way northwards and filled the hollow between Hauz-i-sultan and Pul-i-dellâk. A year later the breach in the dam was

[1] *Proceedings of the Roy. Geogr. Soc.* vol. x. (1888), p. 624.

considerably widened, and then the depression was filled still more. In 1885, then, the lake Hauz-i-sultan was complete, and travellers had to take a road to the east round the lake. In the end of April 1886, I travelled along this road and wrote as follows : " Below Hauz-i-sultan lies a large lake of the same name, the environs of which are little known to Europeans ; it is, however, probable that the lake has been formed by the rivers Kara-su (= Kara-chai) and Rudkhaneh-shur, which run up from the mountain ranges in south-western Irak-ajmi and flow eastwards. . . . Just below the caravanserai of Pul-i-dellâk flows the large and broad river Kara-su, that is, 'black water.' A bridge, mostly in ruins, crosses it. One half of the bridge is left, but the other has fallen in, so that the river must be crossed by riding through a ford ; it is rapid, deep, and turbid."[1]

Eighty years before Morier wrote of the offshoot of the Kevir lying between Teheran and Kum : " At the distance of 6 miles from *Pool Dallauk*, we entered the swamp of *Kaveer*, which (to its termination at the *caravanserai* called *Haooz Sultan*) we crossed in three hours, a length of 10 miles. It is part of the great desert which reaches into *Khorassan*, the soil of which is composed of a mixture (at least equal) of salt and earth. Though the road, therefore, over which we travelled is as good as those in any other direction across the swamp, it is frequently after rains impassable : as the horses, which in our passage were up to the fetlock, are up to their bellies in less favourable weather."[2]

According to C. E. Biddulph, the lake Hauz-i-sultan is formed by the Kara-chai and the Kum river, which is identical with the above-named Rudkhaneh-shur. Two northern rivers, flowing south-east, are lost in the Darya-i-nemek.[3] Of the depression, on the north-eastern edge of which Siah-kuh stands, Biddulph says that it is divided into two parts, Darya-i-nemek and the new lake, Hauz-i-sultan, which is much smaller, and is separated from the Hauz-i-sultan by many miles of dry land. He believes

[1] *Genom Persien*, etc., pp. 126, 127.
[2] *A Journey through Persia*, etc. 1808 and 1809, p. 182.
[3] *Proceedings of the Roy. Geogr. Soc.* vol. xiii. (1891), p. 645.

that the incrustation of salt is several feet thick, and in some parts "of almost unknown depth." The salt surface looked like ice, and was broken up into polygonal blocks about 2 feet in diameter. The guide said the salt deposit was as thick as 10 feet in the middle, that the salt rested on a quagmire, and that if a hole were digged the whole surrounding space would be flooded by water. When the snow melts on the surrounding hills a sheet of water spreads over the salt, but it never loses any of its solidity. The layer of salt is perfectly level except for small inequalities. It took eight hours to cross, and therefore cannot be less than 20 miles broad. On the southern side the salt crust became thinner, until at length it broke under the weight of the animals. Then the road led south-westwards to Cha-taghi, which "lay amidst deep sand, which it was very difficult to make our way through. It is curious to notice that while to the north of the Darya-i-Nemek no sand is visible, the whole of the southern side is covered with huge sandhills, which stretch from fifteen or sixteen miles inland."

Cha-taghi, as I have mentioned above, is one of those comprehensive names which present a whole landscape to our minds. It signifies "saxaul well"; saxauls always grow in sand, and the water in sand is sweet. A Cha-taghi, then, can be situated only in a sandy desert. At the place in question there was an old caravanserai, "which had been completely swallowed up in the sand with the exception of two rooms, the only means of access to which was through the roof," a clear proof of the encroachment of the sand in a region which was formerly free from sand.

To the lines of the Shah reproduced above Schindler adds in a note: "It would be quite impossible to prove that the lake did or did not disappear at the time mentioned in the tradition, but the legend, as it is, proves that at some time before the advent of Islâm, a part of inner Persia was covered by water. There were probably a number of distinct lakes, now patches of salt desert, which are spoken of in the popular legends of Persia as a vast sea extending from Kazvîn on the north to Kermân and Mekrân in the south, from Sâvah on the west to the Sîstân depression in

the east. These legends, which I have heard at many places on the confines of the desert, not only speak of a great sea, but also mention ships, islands, ports, and light-houses."

During my journey through Khorasan in the year 1890 I made two small excursions to the edge of the kevir basins, which lie isolated to the north of the great Kevir. According to Napier's map, which I had with me, Damgan appeared to be the best starting-point, but when I learned in Gushe that it was 6 farsakh thence to the edge of the salt desert, but 9 from Damgan, I decided to commence the excursion from Gushe. I had only one attendant and two horses, and we rode at a quick trot in an east-south-easterly direction. To the left were the mighty crests of Elburz, while to the right a low hilly ridge was seen protruding into the salt desert.

A marked road runs through dreary steppe, where small heaps of sand lie in the lee of the shrubs. Beyond the villages Khasemabad and Amrevah, after an hour's ride, the white strip comes in sight which indicates the salt desert, now clearly illuminated by the red disc of the setting sun. Then follow the villages Abdullabad and Ghamabad, and then the direction becomes due east through still more dismal country, where scattered ruins mark the sites of deserted villages. From Sulabad we took a *bellad* or guide, who led us through the villages Frat and Taghiabad. A little beyond a very small belt of dunes, with hills of perfectly sterile driftsand barely 16 feet high, is passed. The steep lee sides of the dunes face the south, northerly winds prevailing at this season. Otherwise there is no sand as far as the eye can see.

After 6 farsakh all vegetation suddenly ceases, a stretch of clay soil follows, and then we are at the sharply marked edge of the salt desert. After a ride of a mile and a quarter more we are surrounded on all sides by a pure white crust of salt, which becomes firmer and thicker the farther we advance. Here we meet a small caravan laden with blocks of pure salt 4 inches thick, to be sold in the towns.

We now walk for more than a mile to spare our horses,

and at length halt at a place where several large "leads" are witnesses of the visit of the salt caravan. The incrustation is here $3\frac{1}{2}$ inches thick, pure white above, and becoming more and more dirty below, all resting on sodden yellow plastic clay. In the leads the water stands nearly 2 inches deep. At half-past ten o'clock the air temperature has risen to 80.8°; at the depth of two inches the thermometer marks 77° in the salt and 77.5° in the clay. A thermometer laid in the sun on the salt crust rises to 84.2°, but laid on a dark cloth to 102.6°. The water in the leads is heated up to 86.9°.

East and south it extends like an ice-covered sea with an absolutely level horizon.

In winter this salt crust is said to be not infrequently covered with a lake 3 feet deep, which gradually dries up in summer. In summer and autumn the salt is quite dry as I found it. This depression is of exactly the same kind as that crossed by Vaughan and Biddulph, the Darya-i-nemek, a temporary and vanishing lake, which is filled in the rainy season by a very shallow layer of water, and is equally rapidly emptied by evaporation. Thereupon the salt is left behind, and increases in thickness year by year.

Brownish-yellow streaks are seen on the salt crust, which are found to be driftsand brought hither by the wind. In Gushe also the Persians declared that evil spirits haunt the interior of the Kevir.

Farther east on the road to Meshed, between the stages Mian-desht and Abbasabad, is seen to the east-south-east a strip of kevir fairly close at hand, and if one ascends to the roof of the *chaparkhaneh* of Abbasabad the white salt expanse seems still nearer. From this place I made a very short excursion south-south-east on October 5. In the distance the bluish hills were visible which bound the basin on the south-east. It took only an hour over steppe and yellow clay to reach the first salt, which here is like a slight crust of hoar-frost. One or two steppe plants grew on cones 3 feet high. Then we came to a river bed with a quagmire, where there was beautifully crystallised salt and half an inch of water. From this point I rode back north-eastwards to Sadrabad, leaving Pul-i-abrishum, or "silk

bridge," on the left, and crossing on the way the bed of the Kal-mura. My guide had never heard this name, but called the river Ab-i-shur, or "salt water." Its bed was here only 10 yards broad, and its bottom lay 5 feet below the level of the ground. A stream 3 yards broad and 5 feet deep flowed extremely slowly towards south-south-east. The water was salt and bitter. On the banks grew copses of tamarisks 8 feet high. The bed is said to be full of water in winter. Here there were no sandhills, but small banks on the south side of all the shrubs, showing the prevalence of northerly winds.[1]

The small kevir I touched on is not an enclosed basin, for it has an outlet by the Kal-mura, which crosses it, as we see from Vaughan's route, before it flows into the great Kevir. Captain Claude Clerk passed the river in 1857 somewhat higher up than Vaughan, at a point called Zaughuda. He informs us that the river carried a very little exceedingly salt water, and that it was said to flow to Yezd.[2]

During his three months' journey in the parts of eastern Persia nearest to the frontier of Afghanistan, E. Huntington visited in the winter of 1903-4 the Kevir basin, which he names after the oasis of Khaf. He says that it consists of lifeless desert tracts of mud and gravel. Of the Bajistan kevir he says: "Bajistan, 40 miles north of Tun, lies on the southern margin of a large 'kavir,' or salt playa, which, according to Curzon's map, extends some 75 miles north-east and south-west, and from 10 to 30 in the other direction. The playa, at most times, contains a very small amount of standing water, surrounded by a broad white plain of salt mixed with silt, muddy in winter, dry and powdery in summer.[3]

[1] *Genom Khorasan och Turkestan*, vol. i. pp. 29 *et seq.* and p. 107 *et seq.*
[2] *Journ. of the Roy. Geogr. Soc.* vol. xxxi. (1861), p. 52.
[3] *Explorations in Turkestan. Expedition of 1903, under the direction of Raphael Pumpelly*, p. 244.

CHAPTER XLVIII

PERSIAN DEPRESSIONS

The foregoing dissertation has no claim to be considered exhaustive, but it is sufficient to give a notion of the form of desert called kevir, and of the distribution of kevir deserts in Eastern Persia. Innumerable smaller isolated kevir expanses are also found in the kinds of deserts which are known under the names of Lut and Desht. They are of all sizes, and are often only a few scores of yards in diameter. In distribution and extent they diminish from north to south and from east to west. The largest belong to the north-eastern and eastern parts of the Persian table-land. And the same seems to be true of the sandy deserts. They diminish from north to south and from east to west. We have only to compare the immense deserts of Kizil-kum and Kara-kum with the comparatively small desert areas in Iran.

Equally subject to natural laws and dependent on climatic factors, above all precipitation and winds, are the lakes of Persia, their distribution and peculiarities. Only in Western Persia are permanent lakes to be found, for instance the Urmia, Van, and Gokcha, of which the last two, however, lie beyond the political boundary. The lakes of Central Persia, as Gav-khaneh, Niris, and Mahalu, still struggle against annihilation with some little success. In Eastern Persia the temporary lakes are only filled with water for two months. That such must be the case is not strange. During the dry season all the rivers and lakes, lying in a layer as thin as paper on the salt incrustation of the depressions, evaporate very rapidly, giving place to

burning drought. God-i-zirre, which only in certain years contains water, is, as a rule, dry, and I suspect that Hamun-i-mashkil and Lora-hamun also are temporary phenomena. The great Hamun only in Seistan is an exception, but this lake is fed by the great Hilmend, which draws its waters from hills which are exposed to the precipitation of the south-west monsoon. And yet the Hamun also is following the general course, for the lake fluctuates tremendously in different seasons.

In Eastern Persia, then, one can hardly speak of any but dead or dying lakes. It is to a great degree this circumstance which accounts for their occurrence in close association with driftsand. The existence of belts of dunes of more or less extent on the southern margins of all the depressions in Eastern Persia struck me forcibly during my last journey in this country. The stage at which the lakes happen to be seems to be of no special consequence, for driftsand lies to the south of the great Hamun, just as in the southern parts of the Tebbes basin. Whether the lakes are living or dead, still the sand is there. God-i-zirre is rather a water-channel than kevir lakes, but this depression has its sand-belts on the southern edge all the same. With a little ingenuity we could extend this law on a large scale also to the Sea of Aral and the Caspian, though the sandy areas there have rather their sites on the south-eastern and eastern coasts.

Of course the configuration of the country also plays an important part. On the southern shore of the Sea of Aral the shifting delta of the Amu-darya prevents the accumulation of ordinary dunes, and on the southern shore of the Caspian both the plastic and climatic conditions are as unfavourable as possible to their formation.

Before we pass on to seek an explanation of this conspicuous phenomenon in one of the most weathered, desiccated, and scorched-up regions of Asia, we will select some instructive examples from the experiences of other travellers with especial regard to the attitude of the sand to lakes.

Exactly a hundred years ago, in the year 1810, Lieutenant Pottinger accomplished a bold and meritorious

journey from Kharan in Baluchistan to Jalk on the Persian frontier, passing east, south-east, and south of the large salt depression, and the lake Hamun-i-mashkil. Sir Thomas Holdich cites in his last book one or two of Pottinger's experiences in this very tract.[1] It seems that the first part of the journey was not so dangerous, and that the difficulties commenced farther towards the south-west, in the sandy desert. Pottinger describes it as a sea of red sand rising in dunes to a height of 10 to 20 feet. Their steep lee sides sloped to the south-east, showing that northerly winds predominated. This wind prevails from June to September, and is called the *bad-i-simun* or pestilential wind, and kills men and scorches up the vegetation. In April he found the Mashkil river dry. Of this Holdich says that it falls extremely slowly to the Mashkil swamp.

This excerpt suffices to prove that the law referred to holds good, and that a sandy belt extends to the leeward or the south-east side of the lake basin.

On later maps of Persia we find in the south-easternmost part, Mekran, a long depression, drawn out from WNW. to ESE., and therefore parallel to the strike of the hill ranges. On the maps it is represented as containing a lake or swamp, called Jas-morian, but I have never succeeded in finding any detailed description of it.

E. A. Floyer travelled in the year 1876 to the east and west of this great depression, but could not decipher its character. A lake was not visible from his route, and there is no indication of it on his map, published in 1882. He even assumes that the rivers Halir and Bampur, which enter the depression from the west and east respectively, unite, and as the river Sadich flow into the Gulf of Oman. But of the road between Maskhutan and Bampur, that is to say, the country immediately south-east of the lake, he says that it is "open country, all sandhills. Crossed some large ones called the Allūd Rig." Of the tract close to Bampur on the south-west he says that he trudged "over the high heavy sandhills." At Geshkoh he found pools of rain-water in the sand, and then had to travel two miles more through deep sand. On the map also is

[1] *The Gates of India*, pp. 339 *et seq.*

inscribed "High hills of loose sand," and just in the tract south-east of the lake, "Sandy Desert."[1]

Major P. M. Sykes travelled both to the north and the south of this temporary lake in the years 1893-94 and in 1898. He gives the Jas-morian a length of 50 miles, and says: "In a year of heavy rainfall its area is, of course, enormous, but as the summer advances, it dries up either wholly or for the most part." According to his description it would seem that the swamp proper is surrounded by a ring of kevir. Of the road between Ifaka and Bampur he says: "A belt of sand quite as bad as any part of the Lut, lay between us and the Bampur river."[2] He therefore fully confirms Floyer's report of a regular belt of dunes in this region where it might be expected, but we cannot gather from his description whether this belt extends all along the southern shore of the lake. He only states (p. 308), that north of the Bashakird mountains "is the open plain running down to the Hámun."

Curzon says of the Mekran desert that it consists of thin particles of wind-driven sand.[3]

In the solution of the problem now before us, it is of little moment whether the Jas-morian is really a lake or only a temporary swamp. Keith Abbott, who travelled to the west of it in 1850, was the first to mention it. He says that the rivers Rudkhaneh-shur and Halir-rud join, "and flowing through Rudbar, pass on to Jaz Morian, a plain eight stages distant, between Rudbar and Bunpur, where the water spreading over the country is lost in the sand," and he also asserts that the rainy season lasts from January till March.[4]

He also mentions the presence of driftsand in the basin. Still more explicit is the account given by Major Oliver St. John, who travelled twenty years later from Bampur to Rigan, north of the Jas-morian. "For the first five marches it (the road) continues in the Bampúr valley, which forms one with that of Rúdbár and Jírúft. The northern side of this is clad with acacia jungle, the south is a sandy

[1] *Unexplored Baluchistan*, pp. 76 and 263.
[2] *Ten Thousand Miles in Persia*, pp. 143 and 121.
[3] *Persia*, vol. ii. p. 258.
[4] *Journal of the Roy. Geogr. Soc.* vol. xxv. (1855), p. 46.

desert intervening between the mountains of Bashakird and the Bampúr and Rúdbár rivers. These meet at a place called, according to Keith Abbott, Jaz-morián, but whether their flood-waters escape thence to the sea or are lost in the sand is uncertain. Major Lovett heard the former; my informants stated the latter."[1] St. John also speaks of sandhills near Bampur, and says that the dunes are piled up by the north-westerly winds. But most interesting is his account of the sandy desert on the southern edge of Jas-morian, which is in complete harmony with the law of sand distribution to which I have called attention.

In connection with the distribution of kevir deserts in Persia, St. John treats of their relation to sand. He says that the most characteristic feature in the Persian lowlands is the salt swamps, which are called in the northern part of the country kevir, and in the south kafeh. Where the drainage is insufficient to form lakes, like Urmia and Niris, a miry clay is deposited in the lowest depressions, which is covered with salt water in winter and in summer with a thick salt crust. The largest is the great salt desert, Desht-i-kevir, which had then been seen only by one European, Dr. Buhse. "The ordinary *kavírs* are innumerable. That south of Khaf is one of the largest." "The banks of the 'Gavkhánah' marsh, formed by the Zaindarúd, are also 'kavir,' and a *kavír*, perhaps the same, was crossed by Trézel, between Abádah and Yazd. The desert of Karmán, called by Khanikoff the desert of Lút or Lot, that of Kharán which bounds Persian territory on the south-east, and the smaller waste of Bampúr, are drier, and therefore more sandy than the northern desert. Perhaps, also, the soil is less favourable to the formation of *kavír*."[2]

Vaughan's description of the lake Gav-khaneh has been quoted above. Comparing this description with St. John's account of the Kheirabad swamp lying east of the Niris lake, we find that the difference between a salt lake and a salt swamp in Persia may be very slight. The latter is a *kafeh*, or salt desert, nine miles broad, of which the last four

[1] *Eastern Persia. An Account of the Journeys of the Persian Boundary Commission, 1870-71-72*, vol. i. p. 79.
[2] *Eastern Persia*, vol. i. p. 15.

are covered with a solid white saline incrustation. In winter it is entirely covered with water, and is very dangerous to cross, for the clay liquefies off the beaten track. "This salt swamp extends to a considerable distance northwards, but it is not a continuation of that in which the Zaindarúd terminates, though in the same valley."[1]

The southern and south-eastern shores of Gav-khaneh have never, as far as I know, been visited by a European, and therefore we are in ignorance of the state of dune formation on this lake.

Immediately to the south-east of Shiraz, there is a lake which Abbott calls Darya-i-nemek, but St. John the Mahalu lake. According to the former, it is 6 farsakh long and 1 broad. It is very shallow, and its south-eastern third dries up in summer, so that a layer of salt as much as $2\frac{1}{2}$ feet thick is exposed. It can be crossed on foot. The salt is sold in Shiraz and the surrounding villages.[2] According to St. John, steep limestone cliffs stand close to the south-western shore, so that the configuration of the country renders the formation of sand-dunes impossible.

On his way from Seidabad to Niris Abbott passed the "Keffeh," which St. John afterwards crossed by the same road. Of the Niris lake he says that it is called the Deriah, or Sea of Neyriz, or Kheir, or Deriah-i-nemek, stretches from NW. to SE., and is quite dried up in summer, so that its bed can be crossed. The water is salt, clear, and frequented by numbers of flamingos.[3] St. John says of the same lake that at the village of Khir it is a mile broad, and can be waded through in summer. The water is less salt than in the lake near Shiraz.

All the travellers who have visited the Niris lake speak of the beauty of the surrounding scenery. Captain H. L. Wells made an exact map of the lake in the year 1881. On the slopes of the southern shore hills he found whole woods of pistachios. He wished to take a bath, but, though he went out a quarter of a mile from the shore, the water did not come above his knee. All the water

[1] *Eastern Persia*, vol. i. p. 106.
[2] *Journal of the Roy. Geogr. Soc.* vol. xxvii. (1857), p. 151.
[3] *Ibid.* vol. xxv. (1855), p. 71.

draining into the lake was salt.[1] From Wells's description and his detailed map we can understand that sandhills cannot possibly be formed on the southern shore of the Niris lake. There is no room for them, for the lake is shut in between well-clothed hills. This is quite different from the environment of the lakes in Eastern Persia. The climate here is more humid than in the east. Urmia, Niris, and Jas-morian lie in one and the same longitudinal valley, and the situation of Niris in relation to the other two makes it quite natural that it should be a mean between them, with more water and more constant than Jas-morian, and with less water and more ephemeral than Urmia. And as to the development of sand, we find that it is really a strikingly characteristic feature of east Persian lakes.

We shall return, in a later chapter, to the question of sand distribution in Persia.

In a country which so much abounds in deserts and desert formations of various kinds in different stages of development, the language must have several different terms to denote these conceptions. And such is the actual case. The usual, general term denoting no especial type is *biaban*, from *bi* = without, *ab* = water, and *an*, the plural termination. So the whole word means without water of any kind. A diminutive of biaban is *biabanek* (small desert, or half desert). This word I have not found in colloquial use, but as a geographical name for the region round Khur.

Less common is the Arabic word *sehra*, plural *sehara*, which in the African Sahara denotes plain country in general, and desert in particular. In Persia it signifies, according to Polak, uninhabited land. *Desht* can be most closely translated by waste steppe, or plain. It is certainly a transitional form between steppe and desert, a form, therefore, which does not exclude the occurrence of vegetation. The combination Desht-i-Kevir involves a contradiction, for *kevir* excludes all vegetation, which *desht* does not. I have never heard the combination Desht-i-Lut, but it is common on the latest maps, and it is quite possible that it is used in certain parts. When, however, the word

[1] *Proceedings of the Roy. Geogr. Soc.* vol. v. (1883), p. 138.

occurs in the combination Mian-desht, one of the stations on the Meshed road, it is quite appropriate, signifying simply "in the middle of the plain."

The Persian word *shur*, which means salt, is never used here for desert, but in Central Asia is synonymous with kevir. In Persia it occurs only in combination with a substantive, as, for instance, Ab-i-shur, Rudkhaneh-i-shur, Shur-ab, Shur-gez, etc. It is, then, in Persia an adjective, but in Central Asia a substantive. Polak mentions the word *shurtsar* for salt desert, and makes it synonymous with kevir.[1]

Sand is called *rig* in Persian, and wherever this word occurs on the map one may be sure that there are belts of dunes. *Rigistan* = place of sand; *Rig-i-jin* = sand desert of spirits; *Rigan* = sandhills.

Most common of all are the terms *kevir* and *lut*, but on the etymology of these words opinions differ. Morier speaks of the Darya-i-kebir, "the great sea," which St. John corrects to "lake of salt mud." According to him, *kuweer* means "salt swamp." Richardson translates the word *caveer* by "salt ground where nothing grows." Fraser gives the meaning "salt desert, whether wet or dry."

Lord Curzon refers to Consul-General Houtum-Schindler's various attempts to find a plausible derivation. Schindler says that kevir is a salt swamp or a salt desert. Some authors have derived the word from the Persian *gâv*, hollow or depression, synonymous with *gôd* or *gôdal*, but hollows may be fruitful, while a kevir is always a salt desert entirely devoid of vegetation. "The origin of the word Kavîr is perhaps the Arabic Ḳafr, Ḳafreh (pl. Ḳufûr), which is the ordinary appellation for the deserts of Arabia and Africa. The word is seldom met with in older authors."[2]

Major Sykes supposes that the word comes from the Arabic *kafr*, and says that this word is still used unchanged in certain parts of Persia to denote desert. This circumstance is just what makes this derivation improbable in my

[1] *Persien, das Land und seine Bewohner*, vol. ii. p. 365.
[2] *Proceedings of the Roy. Geogr. Soc.* vol. x. (1888), p. 628, note.

opinion; for if the Arabs introduced the word, it is difficult to understand why it has been corrupted in some parts of the country and left unchanged in others. Wahrmund writes the Arabic word *qœfr*, plural *qyfâr* and *qufur*.[1] This derivation becomes much more improbable when we remember that *kafr* signifies desert in general and particularly desert of the usual Arabian and African type, sandy, stony, and extremely dry. In a kevir there is neither sand nor stone, but water and salt. The difference between a kafr and a kevir is as great as between a kafr and a river delta.

For my part I inclined at first to the old form Darya-i-kebir or the "great lake," which, moreover, is consonant with the tradition of a large inland sea. The word *darya* is still applied to several salt deserts with ephemeral lakes, *e.g.* the Darya-i-nemek or salt lake lying south of Siah-kuh. Both at Jandak and Turut the Persians spoke of the *leb-i-kevir*, the "lip of the kevir"; just as in the case of the great Hamun, where the expression *leb-i-hamun* or sea-shore is in constant use. The Arabic word *kebir*, or great, would naturally be used to signify that the northern salt desert is the largest of all. I believed I had found a strong confirmation of the correctness of this derivation in the name of a small village of ten houses situated a day's journey north of Destgerdun on the eastern edge of the salt desert. It is called Cha-i-kebir or the "great well."[2]

However, W. Tomaschek has changed my views by his meritorious treatise, *Die Wege durch die persische Wüste*. He there writes: "The largest area of the country, especially in the northern parts, is occupied by salt desert and salt steppe. Even in the transitional zone we came upon several places which bore this character; the occurrence of a Kawîr (older form *gawér*, from *gaw*, cavity) or a *kefeh* (from *kef*, froth, saliva) in the lowest parts of the trough, is typical of this form."[3] This suggestion has, as we have seen, been brought forward by Schindler, and as Tomaschek grounds his conclusions on

[1] *Praktische Grammatik der neu-persischen Sprache*, vol. ii. p. 69.
[2] Compare the name of the great mosque in Baiburt, which is called Jamesi-kebir.
[3] *Zur historischen Topographie von Persien*, vol. ii. p. 24.

the Arabian geographers of the 10th and 11th centuries, Istakri, Makdisi, Yakut, and others, who have left accounts of itineraries through Eastern Persia, his authority has more weight than any other, and we may confidently accept his view that the word kevir is derived from the Persian *gaver* or *gav*, which signifies depression or hollow. It therefore also becomes evident that the name Gav-khaneh for the Sende-rud's lake terminus does not mean a place of cows as Vaughan assumes, but a depression or kevir hollow in which the river is lost.

Desht-i-lut signifies, according to Curzon, the great sandy desert, and this author rightly rejects the fanciful explanation that the Lut has some connection with the Lot of the Bible and his wife who was turned into a pillar of salt.[1] Bunge says that the word betokens bare, and Schindler agrees with him, and also Tomaschek, who translates Desht-i-Lut by "bare surface." Schindler alludes to the Persian *luti* signifying tramp or ragamuffin, which is also mentioned by Sykes. St. John translates lut by "waterless." To my question how the word was used the Persians answered that a lut is where there is no water and vegetation. The word has, then, a wider connotation than kevir.

Sykes makes the following distinction between the two terms: "And firstly, I would urge that geographers have, without sufficient grounds, divided the great desert of Persia into two regions, that to the north being termed the Dasht-i-kavir, and that farther south the Dasht-i-lut." He more correctly holds that the name Lut applies to the whole desert, and that every salt swamp is called a kevir.[2] This is only partly correct, for kevir is the only correct name for the great salt desert in the north, and every other desert depression of the same type is a kevir. Lut, on the other hand, is the south Persian desert, and the term is not met with till we come to the south of Tebbes. A lut may contain many kevirs, though they are usually called nemek-sar or salt reservoir. Desht-i-lut is translated by Sykes "bare desert."

[1] Compare the Arabic name Bahr Lut for the Dead Sea, and also Bint Sheik Lut, or Sheik Lot's Daughter, for a rocky point on the eastern shore.

[2] *Ten Thousand Miles in Persia*, p. 31.

In his narrative of his fifth journey in Persia,[1] Sykes has partially modified his views of the etymology of the two words. He says that the Arabian writers and the Persian also, to some extent, used the word *mafáza* (waste), which was afterwards replaced by the word kevir or kefe. Kevir signifies salt desert, but its etymology is uncertain. The word was used on all Persian maps till quite recently, to indicate the whole desert, but now it is replaced by the word lut; kevir is now applied only to tracts which are salt. Sykes acknowledges that some Persians still derive the word from *lut* (bare); but now he considers it beyond dispute that the name comes from Lot, Abraham's nephew, for in an Arabic geography, published in 1903, the name of the desert is spelt in the same way as Lot's, not as in *lut*, bare. He therefore holds that the question of nomenclature is definitely decided. This conclusion seems somewhat hasty, and it is quite wrong to let the name Lut on the accompanying sketch-map embrace the whole of the northern desert. Even if an Arabic geography uses a spelling which suggests such an interpretation, it is certain that the name lut is not applied to the northern desert, but that this is exclusively known by the name kevir, like all other salt depressions, unless they are called instead darya-i-nemek or nemek-sar.

Lastly, it may be mentioned that Huntington translates *darya* by lake, *hamun* by swamp or a lake partly open, partly filled with reeds; he quite correctly identifies a nemek-sar with a temporary salt lake, which is also true of a kevir, though this is drier.

[1] *Geographical Journal*, vol. xxviii. (1906), p. 451.

"Aperiam terras gentibus."

CHAPTER XLIX

ALEXANDER'S MARCH THROUGH SOUTHERN BALUCHISTAN

Most European travellers who have passed through Persia have noticed the number of ruins of towns and villages, caravanserais and mosques, towers, walls, and irrigation canals all along the roads and in districts which are now quite uninhabitable. This is the case, to a greater extent than elsewhere, in the eastern provinces, southern Khorasan, Kerman, Seistan, and Mekran, and no one has represented this with greater clearness than E. Huntington in his valuable work *The Pulse of Asia*, where he devotes a whole chapter to it. He relies on historical data, and, beginning with Alexander the Great, he seeks to prove that it would be impossible at the present time to conduct a whole army along the coast of Baluchistan. He alludes to the utterance of St. John that a Craterus would in our days find it troublesome enough to lead his elephants and his heavy baggage from the Hilmend to Narmashir through

a country which, according to St. John's description, is a perfect desert. Huntington shows, further, that Seistan was formerly much more densely peopled, as is evident from the numerous ruins. Quotations from older and more recent descriptions show that the climate in south-eastern Persia and south-western Baluchistan is in a period of increasing drought. He found two terraces at heights of 15 and 25 feet respectively round the Hamun basin, but he recognises that the desiccation does not proceed steadily and regularly, for Kuh-i-khoja, in the middle of the lake, was once connected with the shore.

Huntington summarises his views in the following chief points. Of the four provinces Khorasan, Azerbeijan, Kerman, and Seistan, the first has suffered more than any other part of the country from war, but yet is one of the most densely populated. Azerbeijan is the next to have been most harried, and yet it is the most densely peopled province of Persia. Seistan has been less devastated, but its population has been decimated far more than that of the other two corners of the country. Kerman has suffered least from war, but it is full of ruined towns, and its population has very seriously decreased. Therefore neither war nor bad government are to blame for the great reduction in the number of the people, and only a deterioration in the climate can account for it.

This view was expressed long before by Blanford, who believes that the country was at one time full of lakes in which the alluvium of the existing plains was deposited.

Blanford believes also that Persia was much more densely populated 2000 years ago, and better cultivated, than in our day.

It is not easy to arrive at a satisfactory solution of these questions. E. Tietze, so thoroughly familiar with the geology of northern Persia, emphatically opposes Blanford's theories. He says: "The signs of decay are certainly unmistakable in Persia, but this decay has causes quite apart from climatic variations; and even if a larger proportion of the area of Persia was cultivated in former times, this indicates greater industry and a better administration

at that time, but it does not prove at all that the country was covered with forests and lakes of fresh water."[1]

Still more plainly does W. Tomaschek express opinions at variance with the results arrived at by Huntington. To draw conclusions from the existence of ruins may be very misleading. Tomaschek has made use of the most reliable historical material that can be found, and therefore his conclusions are of extraordinary weight. By comparing the abundant notices of Arabian geographers with explorations of our own times in the same regions he has arrived at the following result:—

"The comparison shows with certainty that the conditions in this region have remained remarkably constant during the past thousand years. Statistics of human habitations are an important factor in this comparison, a measure of the rising or falling capability of the soil for cultivation. If, for instance, Istakri informs us that the village Kharânek had 200, and Sâghand 400, families, and we now, a thousand years later, find in the same places almost the same number of inhabitants, we obtain valuable evidence of the stability of natural conditions in certain parts of the dry region, and a proof that this soil is absolutely incapable of supporting more living beings than now and in former times."

"It can be shown of some regions that the cultivation of the soil within their bounds has markedly improved owing to the restless activity of man, in spite of years of scarcity and the raids of plundering nomads. In other places, on the contrary, nature has of itself changed for the worse, the constantly increasing evaporation has caused the drainage to fail, and advancing masses of dust and sand have buried old cultivated oases for ever. While the changes of nature proceed so extremely slowly that a thousand years is a short period in the existence of the earth's surface, yet the almost imperceptible changes in all existing things is clearly apparent to the attentive observer, even in tracts which bear outwardly a character of stagnation."[2]

By describing fourteen of the Arabs' desert routes and

[1] "Zur Theorie der Entstehung der Salzsteppen," etc., *Jahrbuch d. K.K. Geologischen Reichsanstalt*, Bd. 27 (1877), p. 341.

[2] *Zur historischen Topographie von Persien*, vol. ii. p. 3.

comparing them, as far as possible, with the accounts of modern travellers, Tomaschek shows that the climate has remained unchanged during the past thousand years. In this thousand years Marco Polo's journey took place, and I have shown above that he must have passed through Bahabad to Tebbes in order to cross from Kuh-benan in eight days a desert of the kind he describes. For if he went by any other road, and in eight days did not meet with a single oasis, it can only be explained by an improvement in the natural conditions between the 13th and 20th centuries, which is improbable.

While the descriptions of Marco Polo and the Arab geographers give not the least support to the assumption that the climate of Eastern Persia has deteriorated since their time, we have in the works compiled by the historians of Alexander the Great an excellent means of extending the period to 2200 years. It will be acknowledged that most of the ruins we now see in Eastern Iran are of later date than 2200 years. If it can be proved that the climate in the time of Alexander was much the same as now, the ruined settlements must have been abandoned for other reasons.

Such an investigation has been made by Huntington in the work quoted above. That all the interior of Asia is passing through a period of desiccation is a well-known fact. But is it credible that this phenomenon proceeds so rapidly that it can be detected within the course of 2000 years?

When Huntington asserts that all modern travellers, who have followed the track of Alexander, have declared that it would be quite impossible now to conduct an army through regions where water and pasturage can scarcely be found for twenty camels, we must remember that opinions are divided on this subject, for there are also travellers who say that it would be possible for an army to march through southern Baluchistan to India.

Nor is the silence of Arrian concerning the fortunes of Craterus any proof that this general did not suffer as great losses as Alexander. We only learn that Craterus, with the remainder of the army and the elephants, joined the king

in Carmania (Kerman), but nothing of the numbers of men and animals lost.

As little can a comparison between the accounts of Strabo and Sykes allow us to arrive at any conclusions regarding climate. Strabo states himself (Book xv. chap. i.) that many of the Greeks visited India, but that most of their reports were derived from hearsay. "All contradict one another. As they now vary so much in their accounts of what they saw, what are we to think of what they heard?"

It is very different with the incidents which actually occurred, and which are in themselves quite sufficient to portray the nature of the country they had to contend with; and the more so when two authors, whose sources of information now lost, original documents composed during the campaign, relate the same events, as is the case with Strabo and Arrian.

In his sixth book Arrian relates how Alexander set out on a difficult road through Gedrosia, a road where the army suffered from want of everything, especially water. Therefore a large part of the journey had to be accomplished at night, as was natural, since it was the warm season and the departure from the mouth of the Indus took place in the end of August (325 B.C.). The whole force amounted, according to Droysen, to 40,000 men.

They followed the coast at some distance, but so near that it could always be perceived; Alexander wished to look out for harbours and supply the fleet under the command of Nearchus with provisions and water. "But the country of the Gedrosians was everywhere desert towards the sea. Therefore he sent Thoas, the son of Mandrodorus, with some horsemen down to the sea to look if, perchance, there were a landing-place, and whether water and other necessaries could be obtained near the sea. He returned with the information that he had found some fishermen in close, stuffy huts on the shore. . . . These fishermen had only a little water for their own use, which they digged up laboriously out of the sand on the shore, and even this water was not quite sweet. . . . The natives were commissioned to fetch as much ground corn as possible from

the interior, and also to bring dates and sheep to sell to the army."

"He himself continued his march towards the royal town of the Gedrosians, named Pura,[1] whither he arrived in sixty days after starting from Ora. Most of Alexander's historians assert that all the hardships his army in Asia had suffered taken together were not to be compared to the difficulties they encountered here. However, it seems that Alexander did not start on this road in ignorance of its difficulties . . ., but rather because he heard that no one had hitherto got through with an army unscathed, except Semiramis on her flight from India; and even she, according to the reports of the natives, had only escaped with twenty men of her army; likewise Cyrus, son of Cambyses, with only seven men."

"Cyrus also seems to have come to this wilderness to make an irruption into the country of the Hindus, but had lost the majority of his army owing to the desert and the terrible roads. Reports of such a nature excited the desire of Alexander to rival Cyrus and Semiramis, and on this account, as well as to procure from the neighbourhood necessaries for the fleet, says Nearchus, Alexander chose this route, and now the burning heat of the sun, together with want of water, had carried off a large part of the army and the baggage animals in still greater numbers; they perished in consequence of the heat and depth of the insolated sand, but especially from thirst. For sometimes hills of deep but not closely packed sand were met with. . . . And besides the horses and mules suffered still more severely from going up and down over uneven and unstable ground. Moreover, the length of the daily marches was not the least hardship of the army. For want of water forced them to make daily marches too long for their strength."

Arrian speaks, furthermore, of the ceaseless thirst, of the want of provisions which obliged them to kill horses and mules, how the sick were left behind, how the baggage waggons were broken to pieces when it was impossible to drag them through the deep sand, and how at the beginning

[1] Now Bampur or the neighbouring Pahra.

of the march roundabout roads were taken for the sake of the baggage train. Some perished from sickness, others from exhaustion, heat or thirst, the march was continued without a pause, and those who could not take care of themselves were left behind. During the night marches many were overpowered by sleep, and then could not follow the trail of the army. They perished in the sand like shipwrecked men in the sea. Another disaster is thus related: "In Gedrosia it rains, just as in India, in consequence of the trade-wind, certainly not over the plains of Gedrosia, but rather in the hills, whither the clouds are driven by the wind and discharge their contents, because they cannot rise above the peaks. When now the army had encamped at a brook with a little water, solely for the sake of water, its bed was filled in the second watch of the night by showers of rain which fell unnoticed by the army, and it flooded the camp so deeply that most of the women and children accompanying the army were drowned."

Then follows the well-known tale of the scouts who found a drop of wretched spring water in a cleft and presented it to the king in a helmet. He was going on foot to encourage his warriors, and he stopped, took the helmet, commended the scouts, and emptied the water on to the ground. This raised the courage of all. The guide could no longer find the way, for it was lost in drift-sand. Then the king, with five attendants, rode to the coast and caused sweet pure water to be digged out of the sand. All the army followed and skirted the shore for seven days to be always within reach of water. At last he came to the royal city of Gedrosia, Pura, where he let his army rest.

Strabo says that the coast of the Ichthyophagi is flat and mostly treeless, with the exception of palms, a certain thorny bush, and tamarisks. There is an absence of water and edible fruits. Both men and cattle subsist on fish and on rain and well water. Of Gedrosia it is said that the country is certainly less hot than India, but warmer than the rest of Asia; that there, too, there is a want of fruits and water except during summer. Strabo says that Alexander's retreat was purposely effected in summer. It was known

that Gedrosia has then rain, and that the rivers and wells are filled while they are dry in winter, but that the rain falls in the higher regions to the north, so that the rivers carry water down to the coast. "But in the desert the King sent on well-sinkers in advance. . . . They were saved only by the date palms." For the rest his account is exactly similar to the later one of Arrian. It should be mentioned by the way that he represents Carmania as lying south of the Caspian gates, and as this pass is immediately south-east of Demavend, he has evidently included the whole kevir in the desert of Carmania. He says that camel herdsmen live on the border of the cold mountainous country in the north. This is just as at the present time.

It is difficult to determine Alexander's route along the coast. According to Strabo, he never receded more than 500 stadia from the sea. The stadia in question could not have been long, for it is also said that he let the troops rest 20 to 30 stadia from wells, that the soldiers "might not drink immoderately from thirst." If this distance be estimated at a kilometre, he could not have been more than 13 miles from the coast. That he was always very near the coast is shown also by Strabo, when he says that the guide strayed once from ignorance so far into the interior "that the sea could no longer be seen." Therefore it appears that the sea was usually in sight.

To institute a comparison between the general geographical conditions then and now, we must call to our aid some traveller who has travelled as near to the coast as possible. Such an one is Major, afterwards General, Sir Frederic Goldsmid, who, in 1861, travelled on an official mission from Karachi to Gwadar almost by the same route as Alexander. I extract from his description only a few points which illustrate our problem.[1]

On December 12 he set out to the Hubb river, which was 3 feet deep. On the 14th: grass, tamarisks, coast dunes and wells; at the camp two wells of brackish, but drinkable water. The 15th: gardens and cultivation watered from small basins and wells; the Vindore river

[1] *Journal of the Roy. Geogr. Soc.* vol. xxxiii. (1863), pp. 181 *et seq.*

dry ; at the town, Summiani, slightly brackish well water ; provisions and fodder in abundance. The 21st : sandhills, swamp formed after rain ; a camp, a thicket, a village with cultivated land ; from the Poor Ali river to the village Buddo, where the camp was pitched, sweet water in abundance and of good flavour ; after heavy rain the Poor Ali overflows its banks.

December 23. Jungle, grass, and river water ; sandhills ; sufficient pasture for camels. The 24th : a well, a dry bed ; at the camp fodder for horses and camels and brackish water from a river-bed. 25th : thriving cultivators and cattle-owners. "Nor did their cattle appear to want food or water." "The supplies of water from the hill streams must give fertility to the valleys ; if not in grain cultivation, at least in grass and fodder." At the camp a well with insufficient water, but good water at a distance of two or four miles. 27th : sandy level ground ; good grazing for horses ; three dry river-beds, one of which was 18 feet deep and 50 feet broad. 28th : sandhills and erosion furrows from the hills ; at the camp plenty of water from the Hingor river ; sufficient fodder and grazing ; provisions obtained from an Indian merchant living here. On the 31st camped again on the Hingor river.

January 1, 1862. "Narrow ravines and valleys, more or less decked with vegetation." But the road on this day's march was very bad. "It is quite certain that this zigzag winding route would be wholly impracticable for troops, except in continued fair weather. Heavy rain would be fatal to the progress of an army, and commissariat and ambulance arrangements, to be effective, would demand an enormous retinue of followers." The camping-ground was called Shir Koomb or the "sweet water basin," where the water was good and plentiful, but fodder and grass barely enough.

The next two stages were fair. Sometimes what the country supplied would not have sufficed for a larger party than Goldsmid's force. On the 4th the Gorud river was crossed with 4 feet of water on the farther side and swamp on the near side ; sandhills everywhere. The camp was pitched that day at Ormara, a small town of 300 houses

with 900 inhabitants, who lived chiefly on fish and dates. In the neighbourhood a fine natural water reservoir where spring water bubbles out of the steep cliffs. There are several springs in the country. At Ormara itself good water can be obtained by digging wells $4\frac{1}{2}$ feet deep; it soon becomes brackish.

January 16. Swamp after the last rain; at the camp the river Bussole, plenty of water but muddy; fodder sufficient; natives scattered here and there; arboreal vegetation. The 17th: the chief branch of the Bussole delta had 3 feet of water, and was difficult for the camels to cross; tilled land, sand and alluvium alternately; the country is dependent on rain for its water, and its wheat is poor. At the camp a river-bed, water, grazing, and fodder in sufficient quantity; the neighbourhood is inhabited. The 18th: numerous rain furrows. Camp at a stream called Koondree with a natural reservoir which never dries up. Sufficient grazing. Camp at the Shori river; good water, fodder, and barley procurable. The 20th: very good river water. The 21st: Pussnee, a village of 70 huts of pole sand mats; brackish well. 24th: rain-water, or wells can be digged to a depth of 3 or 4 feet. Other necessaries in sufficient quantities. 25th: a swiftly flowing stream, the Shinzanee, renders a détour necessary. At the camp sufficient supplies of everything necessary.

26th. Several small brooks are passed, and the Savaru which is called "a formidable river." Cultivated land; fifteen inhabited places in the country; grazing camels in large numbers. At the camping-ground, rain-water, date palms, horse fodder and sufficient camel grazing. 28th: palms and other trees; fishermen and boatmen; the Barumba, a river with little water. On January 29, Gwadar was reached, a town with palm trees. "Here we found supplies of all necessary kinds, and abundance of good water from the wells."

It should be remarked that Goldsmid's journey was accomplished in a more favourable season than Alexander's. But the description of Captain S. B. Miles, who began his journey on October 14, does not give a worse impression

of the coast land.[1] He started from Gwadar, and so was there at exactly the same time of year as Alexander. He followed as far as Ormara an inland road. Then he passed through the coastal zone, and to the river Desht all went well. There are many villages, of which one, Bul, has 400 houses. On the way were seen traces of old cultivation which had been abandoned; the irrigation depends entirely on rain-water.

October 20. Near the Desht river the country is well peopled and the land fruitful. No lack of good well water. Of the Toomp valley he says: "Springs of excellent water are met with at intervals, bursting out of the solid rock and forming rivulets swarming with small fish." Eight thousand inhabitants in the valley; magnificent date groves. October 24: several villages with date palms; *karezes* or kanats everywhere; "they are very ancient and their construction is ascribed by the people to the Devs" or spirits.

The 25th. Palms and tamarisks; the road is well trodden and good; bridges of palm trunks span the ravines. The Kej valley is 270 miles long; the river low with a weak current and containing seven species of fish, which are caught and eaten by the Baluchis; the fields are watered by rain during the wet season, and at other times by karezes. October 30: Sami, a village with a perennial stream from the hills, besides the river Kil Khor. Here dwell Hindus who buy up sheep's wool. Palms.

November 1. "The valley appears to be full of springs, and, though running water is only met with at intervals, in the bed of the Khor, it probably continues flowing underground." During the next six days good water was found at all the camping-places and dwarf palms, and here and there herdsmen with sheep and goats. The 10th: at Soordoo Fort Miles was surprised at the abundance of fruit trees; apples, grapes, plums, oranges, lemons, citrons, peaches, figs, almonds, etc. The fields are watered from the river, which is named Punjgoor.

Miles estimates the population of the Punjgoor valley at 16,000 to 18,000. A month and a half before a caravan had come hither from Kandahar with wheat, and had left a

[1] *Journal of the Roy. Geogr. Soc.* vol. xliv. (1874), pp. 163 *et seq.*

few days' before with dates. "There is abundance of water for irrigation from the river, and from karezes, of which there are eleven at Punjgoor." The houses are built of palm leaves and matting. The trade with Ormara has increased, but that with Kelat has fallen off.

On November 12, numerous date caravans of camels, asses, and bullocks were seen. At the camp there was no water. But the next day the camp was pitched at a pool fed by a copious fountain of warm but sweet water coming out of the solid rock; there were fish in the pool. Then water occurred here and there, but on the 19th water was plentiful all the way. The 20th: "A regular concatenation of pools and springs of water the whole way." 22nd: Khor Bussool, which we know from Goldsmid's journey, always carries water, but is alternately an almost dry bed and a rushing torrent. From Ormara Miles followed the telegraph line along the coast.

The maps to which I have access, *e.g.* Sykes's in the *Geographical Journal*, "Regna antiquissima Orientis" in Justus Perthes' *Atlas Antiquus* and Droysen's map represent Alexander as leaving the coast for good at Gwadar and then making direct for Pura, the capital of Gedrosia.

Major Euan Smith describes this road as it is in the present day.[1] He left Bampur with 40 men and camels and mules on February 16, 1871. The Bampur river, which is formed by springs, was then full; jungle grows on the banks. Pahra is a town of 120 houses with a wall. According to many authorities Pahra is identical with the Pura of Alexander. During the first four days there was plenty of water and vegetation. In five days he came to the river Sarbáz: "There was a quantity of water owing to the recent rain, but there were large deep pools at intervals collected under the rocks, making it probable that water was obtainable here all the year round." Tamarisks and dwarf palms in considerable quantities.

In the village of Sarbáz there were excellent water, rice, dates, and tobacco. "Our next march was an agreeable one. . . . The cultivation, prolonged without inter-

[1] *Eastern Persia*, vol. i. p. 212.

mission to Dipkhor (14 miles), was on raised artificial platforms, on the river banks, irrigated by artificial channels. The mango, orange tree, and mulberry abounded and flourished. Beans and barley appeared to be the main crops, and were nearly ripe for the sickle. There was a continuous succession of small villages, of which the inhabitants, who lined the banks as we passed, were almost entirely engaged in cultivation."

After more villages, gardens, and date groves an open plateau was reached, which continued unbroken to the frontier of Sind; "and the Persians, should they think fit, may march a large army across it in the direction of, and up to, the Sind frontier, without any material obstacle, and finding water and provisions the whole way. The advance of Persia in this direction would seem, therefore, to present a question of grave consideration."

Baftán is another village in a grove of palms. On the remaining seven days' journey the populous village of Pishin is spoken of, date palms, grass and water, good grazing, desolate country, the river Desht, which in the wet season is so full that it stops the traffic for weeks, and bad water at the last stage, and lastly Gwadar.

If we now compare the old accounts of Gedrosia with the new we must perceive that the differences are very slight; indeed, for my part, the only difference I can find is that the modern reports speak of a country less destitute than the old. Or in what respects has it changed its character? If the coast of Baluchistan in our days is a waste, Gedrosia was "everywhere desert towards the sea." The same sandhills stud the coast, the same Ichthyophagi still live on fish and dates and drink from briny wells or rain-water, just as in the age of Alexander. According to his chroniclers, they lived in huts of shells and whales' bones; now they live in huts of poles and matting of palm leaves, a circumstance which does not tell in favour of a deterioration of the climate. Almost all Alexander's baggage animals seem to have died of thirst, and at any rate a large part of his men perished. Thirst is constantly spoken of, which loosed the bonds of discipline and caused the king to shut his eyes to outbursts of insubordination.

Baggage animals were killed and eaten to avoid death by starvation.

But palms grew then as now, and, according to Strabo, dates saved the survivors. The country was so bad that even a native guide could not find the way, all tracks in the sand having been blown away. Well-sinkers were always sent in advance, and long marches were made because of the scarcity of water. The distance to Pura is 560 miles in a straight line. With 60 marching days that makes 9 miles a day. But the road evidently wound about, and a day or two's rest was taken in more favourable spots. Probably the pace was 19 miles a day. Goldsmid travelled in 25 days from Karachi to Gwadar; Miles took 40 days between the same places, but by a different route in the west; Smith marched between Pura and Gwadar in 17 days. But these travellers had small parties, and Alexander a whole army of 40,000 men at starting. This is the essential difference. Small parties with camels can get through where an army with horses and mules is doomed to perish. And so it happened. All the animals died, and of the soldiers only the strongest survived.

It is quite credible that the season had something to do with the disaster, but I do not believe that it was the determining cause. Alexander travelled from the end of August to the end of October, Goldsmid in December and January, Miles from October to December, and Smith in February and March. According to J. Hahn, the coast lands of the Arabian Gulf are within the domain of the south-west monsoon.[1] Réclus says that Baluchistan is one of the driest countries of Asia, though visited by the south-west monsoon. It rains only in the hills. "Il tombe en effet des averses considérables pendant la saison d'été," and temporary lakes are formed in the valleys. Réclus alludes to traces of a much more abundant precipitation in a past age.[2] Such an age there was, of that there is no doubt. But when? Not within the last 2200 years, but perhaps 20,000 years ago. According to Pottinger, it rains in the country between Eastern Persia and Western Sind in

[1] *Handbuch der Klimatologie*, Bd. ii. p. 162 (2nd Ed.).
[2] *Nouvelle Géographie universelle*, vol. ix. p. 116.

September and October, and from November to March, four or five days seldom passing without precipitation. Mekran has rain in early spring, and in the latter half of summer; this refers only to the highlands. According to Strabo Alexander chose summer purposely because he knew that the south-west monsoon then brings rain with it, which, indeed, falls on the mountains, but fills the rivers and wells down to the coast. And as regards precipitation, there is no real difference between the four travellers we are comparing. Goldsmid had light or heavy rain four times, on January 11th, 13th, 17th, and 24th. Miles does not actually mention rain, but he often speaks of sweet rain-water pools. And he speaks of a caravan of 400 camels which came to Punjgoor from Kandahar at the end of September, and which therefore travelled in exactly the same season as Alexander.

Smith had good showers several times in those parts of his journey which fell within the highland region. It is also evident that Alexander had rain, for he speaks of the natives as dependent on rain-water, and also of a deluge, which fell indeed among the hills, but swept away a large part of the camp, women, and children, baggage, all the king's private field equipment, and all the remaining baggage animals.

There is no doubt that southern Baluchistan is not suited for the march of an army, and with the weapons of the present day still less than in ancient times. Alexander commenced his march with a heavy baggage train, but it was lost on the way. Both Strabo and Arrian inform us that Cyrus, son of Cambyses (559-529 B.C.) made the same attempt and lost all his army except seven men. Yet this great King of Persia, according to Justi, subjugated Seistan and Gedrosia.[1] If the reports of his campaign are to be relied on, he encountered still more formidable obstacles, though his enterprise took place at least 200 years before Alexander.

Most remarkable, however, is it that Euan Smith seriously warns his government against the Persians, and maintains that a large Persian army could make its way

[1] *Geschichte des alten Persiens*, p. 28.

through southern Baluchistan to India without hindrance, obtaining water and provisions all the way. And he is not alone in this opinion, for St. John confirms his assertion. "In the early part of his march through Balúchistán Alexander must, I think, have been deceived by his guides, who seem to have kept him exactly at that distance from the coast where there is least water. Had he followed the Kej valley, the natural road from the Indus to western Balúchistán, he would have found abundant water." [1]

Why did he choose this, the worst of all the roads to and from India, instead of effecting his retreat through the northern pass, afterwards tried so successfully by Timur in the year 1398, Sultan Baber in 1505 and 1525, and Nadir Shah in 1738, when those monarchs conquered India? He was not in ignorance of better routes, and he had himself tried a safe way on this march to India. His campaign was no boyish Macedonian exploit, a marriage feast with a drinking-match to the sound of drums and cymbals. He went wildly and recklessly to work more than once, but he had a great object in view. He wished to do all in his power to knit together the vast areas of his new empire. Therefore he had to open a sea route between the Euphrates and the Indus. Therefore Nearchus must be sent with the fleet along the coast. And the latter accomplished his mission with such exactness that, though the coast-line has changed in some places since then, mariners of the present day can identify from his logbook most of the places where he anchored.[2] With the vessels of those days it was impossible to sail at a long distance from the coast, for provisions and water for several months could not be carried. Nearchus was, therefore, dependent on the coast. His fleet consisted, according to Droysen, of 100 vessels. His voyage had to be supported by the army on land, which supplied him with victuals and water.

Therefore Alexander was obliged to skirt the coast at any cost. Droysen says: "He did not abandon his great

[1] *Eastern Persia*, vol. i. p. 75.
[2] Markham's *History of Persia*, p. 412.

design because of the dangers inevitably connected with it, he did not shrink from the sacrifices the enterprise would entail, he did not listen to the voice of human suffering when an important object was in view; and if we see nothing but what is grand and justifiable in the idea of winning Asia for Hellenic civilization, we must also accept the consequences, even if they, according to human conceptions, are opposed to what is humane and possible, and recognize them as of historical importance."[1]

In the summer of 325 Alexander had 80,000 men left. Of these at least 30,000 were with Craterus, 30,000 to 40,000 with the king, and the remainder, about 12,000 men, in the fleet. Droysen's description, based on all available sources, gives a fearful picture of this unfortunate journey. At the beginning all went well, but from the country of the Ichthyophagi the story runs: "Now the army proceeded farther; it approached the most terrible parts of the desert; hunger, misery, and license increased at a frightful rate. No water for 60, 90 miles, deep and hot sand, heaped up into great dunes like billows on a stormy sea, in which the men sank deeply at every step and struggled on with unspeakable effort, only to begin the same toil again; and to these evils were added the darkness of night, the terribly increasing disorder, strength exhausted to the uttermost by hunger and thirst, or misapplied to serve selfish ends. Horses, camels, mules, were slaughtered for food; the draught animals were unharnessed from waggons wherein the sick were left to their fate, the only anxiety being to get on faster. Whoever lagged behind from weariness and want of strength found hardly a trace of the army in the morning, and if he did he strove in vain to catch it up; he suffered from dreadful spasms in the burning sun or lost his way among the labyrinthine dunes, slowly dying of hunger and thirst. . . . Thus scenes of agony succeeded one another; and when at length during the subsequent march a violent wind stirred up the sand of the dunes, sweeping away every vestige of path, and the native guides lost their way and no longer knew in which

[1] *Geschichte Alexanders des Grossen*, ch. 8, p. 466.

direction they were going, even the most courageous lost hope and death seemed inevitable." And after the arrival at Pura: "Thus at last the army reached its destination, but in what a state! The march from the country of the Oritae through the desert had lasted 60 days; but the sufferings and losses on this march were greater than all the preceding put together. The army which had marched out of India with so much pride and pomp had shrunk to a fourth its size, and this bedraggled remnant of the world-conquering army was enfeebled and worn-out, in tattered garments, almost unarmed, their few horses emaciated and in wretched condition, the whole presenting a picture of the deepest misery, enervation, and dejection."

Alexander stayed in Pura to give as many of the stragglers as possible time to gather round him. In the desert the motto of the army had been: "Sauve qui peut." The fourth that had escaped had lost everything, even to their weapons. They were a troop of fugitive ragamuffins. Thirty thousand men had remained in the desert, besides women, children, and baggage animals, and even camels, according to Droysen. The coast of the Ichthyophagi hides many remarkable secrets under its wandering dunes.

Sir Thomas Holdich has tried to identify many places and roads of ancient and mediæval times with those of to-day.[1] In an accompanying map he has also marked Alexander's route. And he alludes to the expedition which, in the reign of the Khalif Walid I., was sent through Mekran to India to extend the true religion. The expedition was under the command of the young Mahomed Kasim. It had a fortunate and successful issue, and the dominion it established over the Indus valley lasted till 1005. The invading force consisted of 6000 mounted men on camels and 3000 infantry soldiers, and was further reinforced in Mekran. "It was with this small force that one of the most surprising invasions of India ever attempted was successfully carried through Makran—a country hitherto deemed impracticable, and associated in previous history with nothing but tales of disaster." "For three centuries,

[1] *Geogr. Journal*, vol. vii. (1896), pp. 387, *et seq.*

then, whilst a people of Arab descent ruled in Sind, there existed through Makran one of the great highways of the world, a link between West and East such as has never existed elsewhere on the Indian border, save, perhaps, through the valley of the Kabul river and its affluents. Along this highway flowed the greater part of the mighty trade of India."

Holdich speaks of the former wealth of Seistan, and justly adds: "Sistan was the granary of Asia once; it might be so again, were the magnificent irrigation schemes of the past revived." It is, then, not owing to a change of climate that Seistan is so desolate, but because its natural resources are not turned to account as in the past.

In another article, "The Greek Retreat from India,"[1] Holdich follows the march of Alexander along the coast, and insists that Craterus, with the heavy baggage and elephants, was restricted to certain well-known roads where it was easier to travel. But we must remember that Craterus also had certain strategical and political tasks to fulfil. Holdich says that Alexander, up to the Hingol river, "almost step by step followed out the subsequent line of the Indo-Persian telegraph, and at the Hingol he was not very far south of it." After that there was only one possible route. "Nothing here has altered since his days." Farther on we read: "Other writers than Arrian have told the story of Alexander's retreat and of the disasters that attended it, and have inferred, if not actually stated their conviction, that where so great a general as Alexander failed it would be hopeless for others to attempt to succeed. . . . After Alexander's time many centuries elapsed before we get another clear historic view into Makran, and then what do we find? A country of great and flourishing cities, of high roads connecting them with well-known and well-marked stages; armies passing and re-passing, and a trade which represented to those that held it the dominant commercial power in the world, flowing steadily, century after century, through that country which was fatal to Alexander." Holdich says a word in favour of the view that the country in the time of the

[1] *Journal of the Society of Arts*, vol. xlix. (1900-1), p. 417.

Arabs was in a more flourishing condition than in the age of Alexander. At any rate, his exposition implies no deterioration of climate within historic times.

In this connection it is interesting to hear what Lieutenant, afterwards Sir Henry, Pottinger has to say about Alexander's march, for Pottinger crossed southern Baluchistan in several directions exactly a hundred years ago, and was able to give an opinion on the Macedonian campaign from his own experience. He speaks first of Alexander's departure from Patala, and of his penetration into Gedrosia, "in which his troops were thinned by the accumulated hardships of thirst, famine, and fatigue. This march was incontestably to the southward of the Brahooick chain, and had the Greek historians been even less explicit, the nature of the country alone must have decided any question that might have arisen on this point." Of Craterus he says: "We may besides unequivocally conclude, that as that General was purposely detached to shun the deserts of Gedrosia (Mukran), he would not shape his progress through a region in which all the obstacles experienced by the divisions headed by the king in person would have been augmented, by the labour of forcing a passage among inaccessible cliffs and deep defiles."

"Posterior to the Greek invasion, and the partition of that vast empire, on the demise of Alexander, we meet with no further mention of these countries, unless in the unconnected and fabulous legends related of the Guebres or ancient Persians. . . . Ninety-two years after the epoch of the Hijree, the Khaliphas of Bagdad, incited by the combined motives of zeal for the Mohummudan faith, and desire to revenge an insult that had been offered to their dignity by the idolators of Sinde, dispatched an army against that kingdom by the same route that the Macedonian hero had selected on his return to Babylon, nearly one thousand years antecedent. This force is expressly stated to have kept close along the sea-coast, that it might be certain of a supply of water, which is always procurable, by digging a foot or two deep in the sandy beach."[1]

What different opinions have been held about the

[1] *Travels in Beloochistan and Sinde*, p. 264.

constancy or variability of the climate during the last 2000 years may be seen from the following quotation from Léontieff's narrative, "De Tiflis aux Indes," where it is said: "En résumé, il résulte des dires de M. Léontieff, que les conditions climatériques et biologiques du Beloudjistan (ancienne Gadrousie) ont dû brusquement se modifier depuis le passage d'Alexandre. Aujourd'hui, non seulement une armée, mais même un escadron de cavalerie ne trouverait pas assez de munitions et d'eau pour y subsister. Une grande quantité d'anciens canaux obstrués et de petits fleuves desséchés confirment cette opinion du voyageur et démontrent l'existence de la culture dans des temps plus reculés. En général, le Beloudjistan doit être considéré comme une demeure fort ancienne de l'humanité à en juger par les rochers qui se trouvent près de Toump où se sont parfaitement conservées des cavernes d'habitations rupestres."[1]

What are the conclusions we can draw from this? Well, that in remote antiquity one general lost his whole army, and another the greater part of his. A thousand years later a lively traffic, and even armies, used the roads through southern Baluchistan. In our days, two officers, who knew the country from their own observation, have expressed their opinion that a large army could march through, provided it followed certain reasonable routes, and would not encounter any obstacles, but would find all it needed in the country. We are tempted to believe that the conditions are more favourable at the present day than in earlier times. In fact, the result would depend on the equipment and preparations, and scouting, and lastly on a favourable year, for it now occurs occasionally that the south-west monsoon fails in India, and then millions of people die of starvation.

Alexander wished to make the adventure, and staked his chances with all too great recklessness. The enterprise did not succeed, because the country was a desert, as it is now. The fact that he himself came through safely, and for some years more could brandish his victorious spear over Asia, is very apt to make us forget his troubles

[1] *Compte rendu des séances de la Soc. de Géogr. de Paris* (1893), p. 27.

in Gedrosia. If he had died of thirst himself, we should have been inclined to say that only a desert like that of Gedrosia could put a limit to his victorious career and annihilate his army. So much less reason have we to attempt to base a sound argument for a deterioration of climate on his experiences.

Nor does the march of Craterus furnish grounds for any conclusions, for the information about it is extremely scanty. He was ordered to proceed through Arachosia and Drangiana (Seistan) to Caramania or Kerman. He probably passed from Alexandria, on the Indus, through Shikapur to Kandahar, and along the lower Hilmend to God-i-Zirre. But we know nothing definite about the route he chose, much less of the difficulties he had to contend with and the losses he suffered. That he took elephants with him proves nothing. Other generals have done that in Eastern Iran in much later times, and it would not be harder than to lead these animals up to Lhasa and Shigatse in Tibet.

CHAPTER L

POST-GLACIAL CLIMATIC CHANGES IN PERSIA

Before we can arrive at a satisfactory conclusion with regard to climatic variations within historic times we must try to gain an insight into the probable changes that affected Iran during the long interval which has passed since the glacial period.

An invaluable guide or key to the solution of the problem is afforded us by the fluctuating level of the Caspian Sea, and I take the liberty of citing some of the results which Professor Eduard Brückner has set forth in his remarkable work, *Klimaschwankungen seit 1700 nebst Bemerkungen über die Klimaschwankungen der Diluvialzeit.* In this work Brückner has collected all the available notices and observations of the water-level of the Caspian Sea.

Of course the data are more numerous and reliable the nearer they are to our own times. Monteith remarks that during the period 1811-28 the Caspian Sea sank and all the lakes of Persia also became shallower. Sokoloff places the beginning of the period of fall in the years 1809-14, and Lenz says that the sea fell 10 feet from 1816 to 1830. Brückner estimates the sinking of the surface from the beginning of the century to 1830 at $6\frac{1}{2}$ feet. A minimum occurred, according to Khanikoff, in the years 1844-45, and then followed a rise, which from the middle of the sixties showed itself distinctly on all the shores of the Caspian Sea.

By the aid of ancient buildings still existing and by historical notices we obtain some reliable data from a past which extends back for 1000 years. A measurement on the walls of Derbend enabled Khanikoff to prove that

the surface of the sea in the time of Istakri, or in the years 915 to 921, lay 30.45 feet higher than in 1847. Still more decisive is the fact that remains of buildings are found on the eastern, southern, and western shores below the present surface of the sea. On the east coast a caravanserai, and at Resht several houses stand under water. Before Baku there is likewise a serai, of which only a tower rises above the surface. On investigation it has been ascertained that it was built in the twelfth century. The water-level was then 16 feet below its height in 1852. Particular attention should be paid to this fact, that the Caspian Sea was much lower 750 years ago than it is now, for it proves more clearly than anything else that the desiccation of the climate of Central Asia and of the lakes by no means follows a regular curve. Afterwards, a marked rise set in, attaining in 1306-7 its maximum of 35.1 feet above the level of 1852. In order to render the different values comparable with one another Brückner refers them to a common standard (B_1) and compiles the following table :—

Years 915-921	+ 28.9 feet.
Twelfth century	− 13.8 „
Years 1306-7	+ 36.7 „
„ 1638	+ 16.1 „
„ 1715-20	+ 1.0 „

Then follows a period of comparatively high water, then a period of fall and another of rise.

Then Brückner proceeds to show that the water-level in the Caspian Sea depends on the precipitation in the catchment basin. "The fluctuation of the rainfall is exactly reflected in the change of level in the Caspian Sea." According to Woeikoff the Caspian Sea receives yearly on an average a volume of water which would raise its level by 43 inches—if it were not wasted by evaporation ; the sea, then, receives an afflux of 215 inches in five years. If, then, from the period 1861-65 to the period 1866-70 there has been a rise of 15 inches, this value gives the excess of discharge into the sea over evaporation, an excess which corresponds to the increase of the precipitation.

Brückner shows that since the beginning of the nineteenth century wet and cold periods have alternated

with dry and warm periods in all parts of European Russia, and that these climatic changes affected the rivers, determining the duration of their ice mantle and the height of their water ; indirectly they affected the vast Caspian Sea, sometimes raising its surface and sometimes lowering it.

In the conclusion of his work Brückner points out that the dimensions of lakes without an outlet, like the extension of glaciers, are a function of the precipitation, for both are dependent on precipitation. Every change in the relation between influx and efflux must produce an increase or decrease both in lakes and glaciers. During the diluvial period glaciers gave place to lakes in the interior of continents. Where glaciers could not be formed lakes came into existence instead. Accordingly in the diluvial age the Great Salt lake was seven times as large as at present, and Gilbert's and Russel's exact investigations show that its water-level changed several times. Brückner has proved that the lakes and glaciers of the present day fluctuate together, and therefore we may be quite certain that the oscillations in the Great Basin, as in all other lakes, synchronised with the advance or retreat of the great ice-sheet.

During the glacial period parts of the deserts, Kizil-kum and Kara-kum, were covered with water, and "it is certain that the area of the Caspian Sea during the diluvial age was somewhat more than double as large as at present, that the area of the Sea of Aral was at least three times as large, and that the Sea of Aral, the Caspian, and Pontus were connected together. In various parts of Asia it is evident that the period immediately preceding the present was remarkable for a great extension of the undrained lakes and a high water-level." Some of them even had temporary outlets. "Wherever we turn we meet everywhere with a very considerable expansion of water in those regions which occupy too continental a position for glacier formation. In fact it seems as if the same climatic variations which caused the glacial period filled in the continental regions the basins of undrained lakes, sometimes to overflowing."

Brückner arrives at the following conclusion: "The

analogies between the fluctuations of glaciers and of the levels of lakes are so complete that all doubt as to their connection seems to be excluded, and the more so that the parallelism between the movements of glaciers and lakes within historic times has been demonstrated by the investigations of Sieger and myself." Brückner believes in climatic periods which, as regards duration, are intermediate between his 35-years' period and the climatic variations of the diluvial age.

In connection with the problem which has engaged our attention in the preceding chapter, the words with which Brückner concludes his work are of great interest: "A change of climate, such as must have begun after the conclusion of the glacial period, has not hitherto been demonstrated with certainty, and there is still much discussion of the subject; the hydrographic phenomena, which so excellently reflect our short periodic fluctuations, seem to indicate no trace of any such alteration, which shows that this must have proceeded at an extremely slow rate."

In the winter of 1903-4 Ellsworth Huntington accomplished a journey in the easternmost part of Persia, near the Afghan frontier, from Askabad to Seistan and back. In his valuable narrative he proves, with exceptional perspicuity, that the country in question enjoyed in the last geological period an incomparably more abundant precipitation than at present.

Huntington[1] commences by referring to the dry climate of Persia and its scarcity of rivers, which have not had sufficient power of erosion to keep pace with the upheaval of mountain chains. Consequently enclosed basins have been formed where the drainage loses itself in salt lakes, and where the weathering products from the hills are deposited. These basins are everywhere a result of mountain formation, but their permanence is due to a dry climate. He also holds that the homogeneous terrace formations in Western Asia can only be explained by means of a theory of a sequence of changing climatic periods, corresponding to ice periods in northern lands. In Seistan

[1] *Explorations in Turkestan*, p. 219 *et seq.*

the alternations of red and green clay are evidence of a change from dry to wet periods which may count as many as 14 or 15 oscillations. In Seistan he seeks the key for the explanation of the fluctuations of the Caspian Sea. The Quaternary deposits and terraces in Persia indicate an increasing series of climatic changes followed by a decreasing series. The latter correspond, he believes, to the ice periods in northern regions. The last epoch, he thinks, may have taken place even within historic times. During the latter part of the Tertiary age Iran was divided into basins where blown sand and the weathering products of the hills piled themselves above the more regular deposits laid down in water. "At Sistan, and probably elsewhere, a series of lakes appears to have occupied the basin during the glacial period. Nevertheless the general course of events was a gradual progress from larger basins to smaller basins, and from subaqueous to subaerial deposition." The area subjected to erosion is constantly diminished, a consequence of the dry climate. The æolian deposits "consist largely of fine sand, covering the drier plains and sometimes mantling the leeward side of the hills. Their most remarkable development is at Sistan, where the violent winds move the sand with phenomenal celerity and heap it into dunes of great height, which are to-day fast encroaching on areas of gravel and silt. . . . The basin deposits seem to occur almost invariably in one order of superposition, namely silts or other fine materials at the bottom, then gravel, and lastly wind-blown sand on top. It is probable that this order of superposition represents the ordinary sequence of events in a country where basin-making and desiccation are both in progress."

The lacustrine deposits in Eastern Persia show either that the quantities of rain in ancient times were greater than now, or that the climate was colder, the evaporation consequently smaller, and a great accumulation of water in the basins possible. At the Kogneh lake Huntington found river and lake terraces which demonstrated that fluvial and lacustrine epochs alternated with interfluvial and interlacustrine, and he explains the phenomenon on the "climatic hypothesis," that is to say, that we have here to

do with changes in a country which was not covered with ice, changes which correspond to glacial and interglacial periods. At Khaf-nemek-sar and other enclosed basins Huntington found terrace formations, and at the Kulberenj basin he found three shore terraces, two at heights of 50 and 25 feet respectively, and another smaller and lower. They have been formed by a lake at three different levels. They prove that at a very late geological date the lakes of Western and Central Asia were larger than now. As the terraces are everywhere similar, they must owe their origin to a common cause, namely, climate. "The terraces are due to a series of climatic oscillations, and these oscillations were contemporaneous with the successive epochs which in other lands composed the glacial period. If this theory proves worthy of acceptation, it will probably furnish the necessary clue to the elucidation of the recent physical history of the Caspian basin and of other parts of the earth's surface immediately before and perhaps after the advent of man."

At Bereng there were two terraces, 25 and 15 feet respectively above the water-level of the Hamun in January 1904, which was perhaps 5 feet lower than the extreme high level of floods. At the north-western shore of the lake there were also marks of two fluvial or lacustrine epochs, and of two interfluvial, and two levels of high-water must be assumed before the present low-level.

Huntington considers it probable that the dunes of Seh-kuheh were formed during the last 200 or 300 years. He says: "From the recency of the sand-dunes and the freshness of the beach and bluffs, I am inclined to believe that the lake stood at the level of the Seh-kuheh beach at a date which is to be measured in hundreds rather than thousands of years, and which falls well within historical times." According to Vredenburg the same process has gone on at Lora-hamun, which was formerly three or four times as large as now, and had a water-level 50 feet above the present floor. And Huntington says further of the connection between the physical, geographical, and historical documents: "It is evident that the lakes of Sistan and Zirrah and the rivers of Helmund and Shila

have undergone a series of changes intimately associated with the human history of the region. These changes seem to be explicable only on the theory that the climate of Eastern Persia has been growing gradually drier during historical times."

We readily agree with Huntington when he says that the latest geological history of Persia begins with a dry climate at the end of the Tertiary age; then commences a fluvial period consisting of a number of subdivisions with extended rivers and expanded lakes, separated by interfluvial epochs with short rivers and contracted lakes. Everything speaks of a more abundant precipitation in former times than now. Even historical data, legends, and traditions agree in this. The last period of abundant drainage seems to have included the times of Alexander, 300 B.C., and of Istakri, A.D. 900. The change from the abundant water-supply during ancient times to the desiccation of the present evidently involves a change from the last fluvial period to the present interfluvial. To the question whether there is any separate and independent evidence that the climate has altered in historic times, Huntington replies in the affirmative, for Alexander and Istakri show that the climate is now drier. He refers to the reports of Bellew and members of the Goldsmid expedition about years of scarcity and of several successive years without rain. "In view of the periodic return of such famines, it does not seem probable that Persia is capable of supporting permanently a population greatly in excess of that of to-day."

Thus far Huntington. Before we compare his results with other parts of Persia, it may be well to say a few words on Blanford's and Richthofen's views. In the category of Quaternary and recent formations, Blanford includes all superficial accumulations of gravel, sand, and clay on the Persian plains and valleys, and on the slopes of mounds and hills. They cover an enormous area of the country; perhaps more than half is covered with recent deposits. In this respect Persia resembles large parts of Central Asia; Turkestan, Afghanistan, and Tibet suffer from the same drought, insignificant rainfall and the

absence or scarcity of rivers. The central parts of the desert flats consist usually of pale-coloured loam, often covered with blown sand. "These fine deposits may be of lacustrine origin, for it is probable that lakes have once existed in the enclosed plains without outlets, which are now deserts. The surface appears flat, but there is probably in all cases an imperceptible slope towards the middle of the plain."[1] Blanford does not exclude the possibility that the coarse gravel found in the higher regions may be of glacial origin. It should, however, be mentioned that Tietze and other geologists deny that there are any signs of an ice age in Persia.

In another place Blanford rightly remarks: "We have yet to explain the origin of the vast deposits which fill the plains themselves; and the only probable explanation appears to be that these extensive basins were formerly lakes, most of them probably brackish or salt, like the Caspian and the Aral Seas, lakes of Van, Urumiah, Niriz, etc., the fine soil of the plains consisting of silt deposited in such lakes. . . . But for inland seas and lakes to have occupied the interior of Persia, and for large deposits to have formed in them, it is evident that the climate must have been much damper that at present."[2]

F. von Richthofen is opposed to Blanford's theory that the Iranian depressions with their alluvial deposits were shut in during the latest epoch of the Tertiary period by the upheaval of ranges and the introduction of a drier climate. "We cannot accept the theory that sediments of fresh-water lakes constitute the last superficial formations. Even if lakes still existed at the end of the Tertiary period, which then gradually dried up, yet the subaerial forces have been constantly at work during the long ages that have since elapsed, separating by chemical and physical processes loose fine particles and larger fragments from the rocks, and wind and running water have carried them into the basins. Lakes could at most reach up to the lowest pass in each basin; but the deposits extend much higher up the sides, where they could certainly not be laid down by

[1] *Eastern Persia*, vol. ii. p. 465.
[2] *Quarterly Journal of the Geological Society*, vol. xxix. (1873) p. 498.

lakes. . . . All the theories of deposits in basins without outlets, as well as of the occurrence of löss, which we have mentioned, are based exclusively on the assumption of a more general distribution of water and a more rainy climate in former times, while both phenomena, according to our idea, depend on the supposition of a dry climate and, as regards the formation of löss in particular, a climate of drought far in excess of the present."[1]

In this controversy we must side with Blanford unconditionally, for the exceedingly fine material in Persia's kevir basins has been undoubtedly deposited in lakes, fed by numerous silt-laden rivers. During the existing dry period, on the other hand, æolian forces are engaged, with the help of weathering and wind, in spreading a subaerial mantle over the older lacustrine deposits. For at the present time these basins are occupied by temporary lakes only to an insignificant extent; now they are deserts, and in a desert the most important destructive agency is insolation, and the most important denuding force is the wind.[2]

Blanford's theories have also, as already mentioned, been attacked by Dr. Emil Tietze. As far as historic times are concerned, I am inclined to adhere to Tietze's views, for I do not believe that a thorough change of climate can take place in such a short interval as 2000 years. But when it is a question of geological periods, I am convinced that Blanford's conception is fully justified. In the article already referred to, Tietze says: "There is nothing at all, no valid proof whatever, that the Persian salt steppes were covered with sea in the most recent geological period."[3] The layer of salt may have been formed in another way. Water has had only a small share in forming and depositing the quantities of material which fill up the interval between the parallel ranges of hills. For the rivers are exceedingly few. Tietze compares the Persian salt plains with Richthofen's *Lössmulden* in Mongolia, and says that the sunk-basin form of itself

[1] *China*, Bd. i. s. 174.
[2] Supan, *Grundzüge der physischen Erdkunde*, s. 532.
[3] *Jahrbuch der K.K. Geologischen Reichsanstalt*, Bd. 27 (1877), s. 341 u.f.

forbids the supposition that we have to do with a sea-floor. The deposits have, therefore, come into existence in the same way as in kevir. The hills rise up out of masses of detritus, as out of their own ruins. He acknowledges that rivers may at times reach the lowest parts of the depressions, and there deposit layers of salt. This fact he considers sufficient to make all mention of cut-off sea bays and lakes superfluous. Nor does he need, like Blanford, to assume great changes of climate.

However, Blanford's theories have received strong support from the investigations of Brückner and Huntington. And the results I have obtained during my last journey confirm their observations in every respect. When one of the objects I proposed to myself, to insert on the map the limits of the kevir deserts over as great a distance as possible, and when I therefore partly followed their edges, partly crossed right through them, I had hardly any opportunity of establishing the presence or absence of old lake terraces. The most recent terraces and shore lines are already covered with æolian transgressions, that is to say, flat gravel fans from the foot of the nearest hills. The older ones are situated as a rule at a great distance from the margin of the kevir.

Vaughan, however, gives the following interesting information: "I made a collection of various marine shells, including oyster-shells, between Chashma-Gauhir and Baba-Khalet, at an elevation of 100 or 200 feet above, and within 2 or 3 miles of the *kavir* bed. I showed these to Mr. Staal, a German-Russian geologist, who said that they were of an extinct species, and that for a period of from 8000 to 10,000 years at least there had been no sea there."[1]

In the presence of such a proof we need not, like Vaughan, consider it singular that none of the old historians mentions an enclosed sea, and it is not necessary to seek further confirmation in the innumerable tales and legends about an ancient sea which survive among the people dwelling around. Such legends are repeated by Goldsmid and his associates, Schindler, Curzon, Huntington, etc. It

[1] *Geographical Journal*, vol. vii. (1896) p. 166.

is undeniably interesting, as a matter of curiosity, to know that the village of Yunsi has the same name as the prophet Jonah, and that he, according to the local tradition, was here cast up on shore by the whale ; that the panels of the doors of the Jandak fort are said to have been made from the wreckage of a vessel which navigated the Kevir Sea ; and that Husseinan, with several other places on the margin of the Kevir, are supposed to have been harbour towns. But these legends have no scientific value, and no conclusions can be drawn from them. Probably they have sprung up solely owing to the indisputable resemblance of the Kevir basin to an enclosed sea. In this connection I may again mention that the Persians almost always denote the kevir border, that is, the boundary between firm ground of gravel or sand and the treacherous kevir, by the term *leb-i-kevir*.

It would be very useful if we had more detailed information about Vaughan's shells. But, granted that they really indicate the position of the former Kevir lake, we know that they were found at a height of 100 to 200 feet. The average height of the Kevir margin, according to four observations taken by myself and calculated out by Dr. Nils Ekholm, all from the southern edge of the Kevir, is 2411 feet. The lowest point I measured in the interior of the Kevir had an absolute height of 2247 feet. The difference of height from the edge to the lowest point is, then, 164 feet, and if now we take the mean of Vaughan's 100 to 200 feet we get 150 feet, or about the same. When the inland sea reached up to the point where he found the shells, it must have had a maximum depth of about 300 feet.

Of the vertical section of the Persian basins Blanford says : " The margins of the plains usually consist of a long slope composed of gravel and boulders, and with a surface inclination of 1° to 3°. Such slopes often extend to a distance of from 5 to 10 miles from the base of the hills bounding the plain, the difference in level between the top and bottom of the incline being frequently 2000 feet or even more." Here then Blanford allows a fall of the detritus fan of 2000 feet for 10 miles at most. He might

have added that the greater the distance from the foot of the hills the more insignificant becomes the fall. Thus I found on the stretch of road from Teheran to Veramin, 34 miles, a fall of only 705 feet; and from Jandak to the edge of the Kevir 787 feet in 20 miles. From Turut to the edge of the Kevir the fall was 358 feet in 9 miles, but from the Kevir to Sadfe 715 feet in about 6 miles.

The fall in the border zone outside the great Kevir is, then, exceedingly trifling. But yet it is everywhere clearly marked, and observations of altitude show that the stable ground round a kevir basin always falls towards its edge. The fine silt deposits which are called kevir are always situated in the lowest depression of a basin. Tietze appeals to the sunken basin form as evidence against Blanford's theory that lakes formerly existed in these basins. But is it so absolutely certain that the slope in the marginal region, of which Blanford speaks, extends right across the whole basin, that is to say, that the fall is the same (2000 feet in 10 miles) down to the deepest part, and that a similar rise then begins at once?

The following determinations of heights give a clear notion of the relief along a line from south to north, from Jandak to Sadfe :—

Jandak	3274 feet.
Hauz-i-Haji-Ramazan	2556 „
Kevir, February 3, 7 A.M. . . .	2487 „
„ „ 3, 1 P.M. . . .	2369 „
„ „ 3, 9 „ . . .	2247 „
„ „ 4, 3 „ . . .	2326 „
„ „ 4, 9 „ . . .	2356 „
Sadfe	3071 „

We therefore find, both on the south and north, a more rapid fall to the edge of the Kevir, but as soon as we come out on to the Kevir the ground becomes practically level, and the small differences in the barometer readings may very well be caused by atmospheric disturbances. The Kevir has a breadth of 68 miles, and the greatest difference of height observable in this distance is 240 feet.

On the eastern line, where the crossing was accomplished

a few days later, from north to south, the conditions were similar :—

Turut			2671 feet.
Kevir, February	9, 1 P.M.		2313 „
„	„ 9, 9 „		2352 „
„	„ 10, 1 „		2372 „
„	„ 10, 9 „		2448 „
„	„ 11, 1 „		2415 „
„	„ 11, 9 „		2497 „
Aruzun	„ 12		3435 „

Here there is a length of 74½ miles, with a difference in height of only 184 feet. But while on the western line the lowest part of the Kevir is about in the middle of the salt desert, on the eastern line it lies on the northern margin. If we take the mean of the five observations in the Kevir itself on the western line we find it to be 2357 feet, and on the eastern line 2380. In either case we find that the Kevir floor is extraordinary flat, for some few yards almost horizontal. Such an evenness can only be accounted for by the action of a large lake. It is just the same level bottom I have sounded in several Tibetan lakes, *e.g.* the large, shallow lake without a name in Eastern Tibet in the year 1900, and the Ngangtse-tso in 1907. There, too, I found a practically horizontal bottom, and a very gradual rise up to the shores of the lake.

A fine and regular old lake bed is also that which may most appropriately be named after the oasis of Tebbes. During the diluvial period it was most assuredly the site of a considerable lake, as is shown by the conspicuous double terraces which are always to be seen on the left on the road to Pervadeh. They appear like a continuous series of mounds of equal height, with rounded fronts, and separated by ravines and erosion furrows. We found also that a small, shallow salt lake, the Ab-i-kevir, is still left in the lowest part of the basin. This is the last relic of the diluvial lake. A notion of the extremely flat form of the basin may be obtained by comparing the altitudes. Kurit has a height of 2254 feet ; Fahanunch, 2238 ; Muessinabad, 2172 ; the Kevir lake, 2123 ; Camp 42, 2041, and a point to the south of it, 2018 ; Pervadeh, 2041, and the kevir

beyond it, 2024. The farther down we go the greater becomes the distance between the lowest parts of the basin and the terraces.

That the basin of the Desht-i-Lut was also a lake-bed during a damper climate is beyond doubt; and all the more because it borders on Seistan, and is separated from it only by a rather low system of hills. The causes which made the Hamun to attain an incomparably greater depth and a more extensive area must also have affected the Desht-i-Lut, which is an enclosed basin receiving a considerable number of streams from the surrounding hills. On the road along its northern edge are passed manifold drainage channels of large dimensions, out of all reasonable proportion to the present precipitation of the country. Similarly all the numerous basins without outlets which are to be found in Persia, many of which still contain temporary lakes or salt sheets deposited in lakes, were formerly the beds of larger or smaller lakes. Undoubtedly many of them have been connected over sills that still rise slightly above the floor of the kevir beds.

On the accompanying map of Persia the limits of the great Kevir are laid down as determined by Vaughan, myself, and others. But when the basin was full of water, and the lake attained its maximum, its shore was in quite a different position to the present margin of the Kevir. On the whole, the contour of the lake was parallel to the border of the Kevir, but lay outside it; the lake had a larger area than the Kevir has now. The transforming forces on the earth's surface labour in increasing the distance between these two lines. The detritus fans and weathering products of the hills are swept down, and move on over the level ground of the Kevir. These forces are of exactly the same kind as during the damp period when the great lake existed, but they are incomparably weaker in the dry period now prevailing. The coarser material carried down after heavy rain by brooks and floods are deposited on the detritus fan; the finest material, silt, is carried as before out into the Kevir. Therefore, it is a natural consequence that the floor of the Kevir lies higher on the edges than in the middle.

It is evident that such a horizontal filling as the plastic salt loam of the Kevir cannot be a löss formation. It still bears all the signs of a salt lake bottom. It is, indeed, wet in winter, and the ground water stands quite close to the surface. The perfectly level salt layer excludes any supposition of æolian origin. But, as far as I can make out, the conditions in Persia are by no means at variance with Richthofen's explanation of immense löss deposits, as much as 2300 feet thick, in China and Mongolia. He certainly found no trace of glaciers even on the highest hills of China, and considers that the diluvial ice epochs passed by China without leaving any vestiges, owing to the dryness of the climate. The effect of a dry climate is that the fine wind-blown products of weathering fill up all hollows in course of time to such an extent that all inequalities are smoothed out, and even mounds and small hills are buried in them. Thus a flat, basin-shaped salt steppe is formed, on all sides skirted by hills. If the climate then becomes moist, the salt steppe is turned into a löss basin. The precipitation is collected into rivers, which cut deeply into the löss deposits.

During the dry period preceding the ice age the same æolian deposition probably took place in the enclosed basins of Persia. The only unmistakable traces of löss deposits I found at the margin of the Kevir were at Turut. The village is, as I have already stated, built partly on, and partly at the foot of, a terrace of löss which falls steeply or precipitously towards the flat, even slope which runs down to the edge of the Kevir. In the yellow beds of löss, which after rain have a surface as smooth and slippery as the Kevir, the brook of Turut cuts its way down along a furrow, which is shut in on both sides by steep or vertical walls of löss 40 to 50 feet high. The front of the löss bed, towards the salt desert, has a very irregular outline running out in projections and blocks between intruding bays. Of its prolongation east and west nothing is known to me. Northwards the yellow expanse seems to pass, at a distance of perhaps 6 miles, into the grey tone of the present detritus fan which runs up to the foot of the nearest hills. As far as the foot

of the hills no higher and older strand-line is visible, at least to the naked eye, but its presence is not impossible.

It is beyond doubt that the sharp-edged löss terrace of Turut marks the old limit of a lake. Only a large lake standing sufficiently long at the same level, and with powerful billows, could leave so distinct and decided a mark. Doubtless similar æolian deposits are to be found in other places round the Kevir basin, though they may, to a large extent, be deformed by the change to a cooler and moister climate in the diluvial period, which in northern lands gave rise to the great glaciation.

In his interesting essay, "Archæological and Physico-Geographical Reconnaissance in Turkestan,"[1] R. Pumpelly describes the old strand-lines he investigated at Baku, on the Caspian Sea. The highest attained a height of quite 600 feet above the present level of the sea, while others lay at heights of 500 and 300 feet. We need not connect the highest with the damp climate of the ice age, for, notwithstanding that the Caspian lies 85 feet below the Black Sea, a water-level of 600 feet would involve the flooding of almost the whole of Russia. Moreover, all such comparisons of level are worthless, when we do not know the amount by which mountain ranges, with their old lake shore lines, have been raised or depressed during mountain formation. But if, like Brückner, we content ourselves with allowing to the Caspian Sea in former times an area twice as large as the present, and if, with Huntington, we make the fluvial and lacustrine marks in easternmost Persia and Seistan contemporary with the ice age, we can *à priori* assume that the fall of temperature and increased humidity, which gave rise to the collection of such large volumes of water in the region north of the Kevir and in the country east and south-east of it, must also have had a similar effect on the basin of the Kevir itself. The oscillations between dry and moist climates have succeeded one another over all Western Asia, as is natural. The opposite would be both unnatural and physically unaccountable.

We find the same succession of deposits in the Kevir basin as Huntington observed in Seistan: (1) silt and

[1] *Exploration in Turkestan*, pp. 28 *et seq.*

other fine material at the bottom; (2) gravel; (3) drifts and dunes. This, however, applies only to the Quaternary period, for before that we have assumed a dry steppe climate, with æolian formation of löss all over Asia.

After the last glacial period attained its maximum, and the climate then slowly changed to increased drought and heat, the Caspian Sea and the Iranian lakes sank and contracted, among them the great Kevir lake. This at last reached the stage of which Walther says: "If a desert basin is so far filled with plastic material that the inequalities of the bottom are obliterated, the deep trough filled up, and the floor levelled, every change in the volume of water must entail a very considerable alteration in the contour of the lake. The shore moves for miles inwards, and large areas are laid dry."[1] A time might come when the flat Kevir bed contained only in winter a sheet of water as thin as paper, which vanished in summer. At last would come a time when only heavy rains were capable of forming small swamps in the lowest hollows of the bed. This is still the case. When it began it is impossible to say; at any rate, before historic times. It may have been ten, fifteen, or twenty thousand years ago.

During my two meridional journeys through the great Kevir, and, not least, on crossing the Kevir arm between Abbasabad and Khur, I was strongly impressed with the fact that the whole contents of the Kevir are, to a small degree, in motion, like a viscous mass striving to assume a horizontal position. It is, in other words, the same phenomenon to which J. Gunnar Andersson applies the term "moving earth," and which is so common also in the sterile tracts of Tibet. Such a movement is, in fact, betrayed by the scarcely perceptible flat undulations which are parallel to the shore on the northern and southern margins, and seem to indicate a pressure or thrust caused by the addition of freshly washed-down silt.

On the whole, I quite agree with Huntington's views. I must differ with him in one point only, pointing out with Brückner that the change of climate has progressed so slowly that its existence within historic times cannot be

[1] *Das Gesetz der Wüstenbildung*, s. 116.

demonstrated with certainty. When, then, Huntington includes Alexander and Istakri, 300 years before and 900 years after the birth of Christ, within the last period of abundant water-supply, I can follow him no longer. Of Alexander we have already spoken, and have shown that he marched through a desert country quite as miserable and sterile as we now know on the coast of the Ichthyophagi. As regards Istakri, for his time and the next following we can rely on the high-water level of the Caspian Sea, which introduced no improvement in the Persian deserts, as far as we can gather from the Arab geographers. In the twelfth century an ebb occurred which reduced the surface of the sea to a level 13 feet lower than at present. A maximum occurred in 1306, with a waterstand 36 feet higher than now. Thirty years before Marco Polo passed through the desert, and he describes its state as worse rather than better than at present. The fluctuations of the Caspian Sea, which we have found to be a function of the precipitation within its hydrographic area, seem, then, to have exercised no perceptible effect on the Persian deserts, at any rate not so marked that we can find any information about it from historical records.

The fact to which Huntington refers, and which also attracted my attention, that numerous ruins are situated at Zirre and Shela, does not necessarily prove a constantly progressive decrease of water in Mohammedan times. Here, as in Seistan generally and in many other parts of Persia, the numerous ruins may indicate nothing but a change in the position of rivers and lakes. I have fully described a similar occurrence at old and new Lop-nor, where the population was forced to abandon its villages and farms when the river and lake moved southwards.[1] But this movement had nothing to do with a change of climate, and did not entail a diminution of the population.

It is certainly true that Eastern Persia in particular abounds in ruins. Most of them are Mohammedan, and therefore of comparatively recent origin. Were not Veramin and the whole of Northern Persia devastated by Mongolians, and have not innumerable ruins existed since

[1] *Scientific Results of a Journey in Central Asia*, vol. ii.

that time? And are there not other causes which may force a population to desert its town or village? It only needs an ebb in a Brückner period to prevent a canal from reaching any longer a village it has hitherto watered. The village is abandoned, and a new one founded higher up. How often we meet with the names Kale-no, Deh-no, etc., or the "new fort," "new village," etc.! The old remain in ruins, and the ruins become more numerous in the course of ages. Round Delhi lies a whole cemetery of former quarters of the town. It seems an immense field of ruins, and as if in our times the population must have diminished to insignificance. And yet it is only that the town itself has moved.

In Seistan, which, according to Curzon, is richer in ruins than any other equal area in the world, there is no reason whatever to assume a desiccation of climate during historic times. Curzon himself gives the only true explanation: "To the jeremiads of those critics who represent Seistan as consisting of two parts, a desert under water and a desert above water, must be opposed the evidence both of history and of existing facts. If their verdict be true, how comes it that this province was once so famous for its magnificent fertility, its dense population, and its splendid cities? What must be said of the square miles of ruins still encumbering the ground? Fertility in Persia is almost solely dependent upon water-supply; and here, alone among Persian provinces, is enough water not merely to fill great canals as large as rivers, and a network of smaller ditches and dykes, but also very frequently to run to waste in superfluous swamps and lagoons." Curzon quotes several opinions of English travellers in Seistan, and comes to the conclusion that the country's "capacities of production under a more scientific system of irrigation are enormous."[1]

Bellew expresses the same opinion. He says of Bust that this place was destroyed by Nadir Shah on his march to Kandahar and India. "In all these sieges, the fort alone, it appears, was occupied as a strategical position; the city and suburbs had remained a mass of ruins, in much the same state as they are now, since the desolating invasion

[1] *Persia*, vol. i. p. 242.

of Changhiz in A.D. 1222." Of the time of Craterus' march he remarks: "At this period the country must have been in a much more flourishing and populous condition than it is now." Of the Germsel, or the country on the lower Hilmend, Bellew writes: "The valley everywhere bears the marks of former prosperity and population. Its soil is extremely fertile and the command of water is unlimited. It only requires a strong and just government to quickly recover its lost prosperity and to render it a fruitful garden, crowded with towns and villages in unbroken succession all the way from Sistan to Kandahar. The present desolation and waste of this naturally fertile tract intensify the aridity and heat of its climate. But with the increase of cultivation and the growth of trees these defects of the climate would be reduced to a minimum, and the Garmsel would then become habitable, which in its present state it can hardly be considered to be. Under a civilized government there is not a doubt the Garmsel would soon recover its pristine prosperity, and then this part of the Helmand valley would rival in the salubrity of its climate that of the Tigris at Baghdad."[1]

There are, besides, great disasters, which in the form of famine or plague devastate one or another of the Persian provinces again and again, just as in India when the monsoon fails to appear, or in Russia when there is no rain or cholera rages. I myself witnessed the progress of the plague in Seistan in April 1906, when whole villages were actually exterminated, and the deserted houses would then fall into ruins. Probably this is not the first time that plague has harried the unfortunate country. Dr. Kelly also expressed a suspicion that possibly the infection lay concealed in a latent form, and at certain times broke forth again from some unknown cause. When a whole population is decimated by such an epidemic and crowds fly out of the country in panic fear, it is natural that ruins should arise. When the land gradually recovers new dwellings will be built.

Another important factor, especially in Seistan, is the shifting of the river branches. The delta of the Hilmend,

[1] *From the Indus to the Tigris*, pp. 176, 205, and 260.

the life and soul of Seistan, has changed its position innumerable times. Under such circumstances, whole towns and villages must be abandoned and new ones erected beside the new water channels. Where empty walls remain in the dry deserts of Seistan one is often deceived as to their age. They are scraped and worn away by the exceedingly strong north-north-west wind, and therefore look older than they are. In a comparatively short time they are razed altogether.

As there are such evident and sufficient reasons for the existence of ruins in Seistan, it is superfluous to try to account for their presence by a deterioration of climate within historic times. The soil is not less fruitful than before, and, whether the volume of water in the Hilmend increases or diminishes, it is always so enormous that it could provide for the maintenance of millions of human beings. M'Mahon estimates the population of Seistan at 205,000; it has a more abundant supply of water than any other part of Persia of the same extent. According to M'Mahon the Hilmend carries down at the season of low water 2000 cubic feet a second, and at high water 50,000 to 70,000 feet a second. He believes that Seistan might, under a good and wise government, become a second Egypt.[1]

That historical data cannot always be accepted without criticism is shown by the following statement of the famous Chardin, who dwelt for several years in Ispahan in the seventeenth century. Of the Sende-rud he says: "Ce fleuve se jette sous la terre entre Ispahan et la ville de Kirman, où il reparoît et d'où il va se rendre dans la Mer des Indes."[2] And yet this fanciful tale shows that the climate of Ispahan 250 years ago was similar to the present. If the Gav-khaneh had then been a large lake, no Persian would have thought of imposing on Chardin with the story that the river disappeared underground. It was lost, as now, in a temporary salt lake.

When the Arab geographers mention that in the tenth century a road ran straight through the Desht-i-Lut from Deh-i-salm to Bam, which now, as far as I could ascertain,

[1] *Geogr. Journal*, vol. xxviii. (1906), p. 209.
[2] *Voyages en Perse*, vol. iii. p. 4.

is no longer in use, we are tempted to assume that increasing desiccation makes a journey along this road no longer possible. But here, too, other factors come in. In the westernmost part of the Kevir a road was mentioned between Kashan and Semnan, which was used in the time of Shah Abbas, but is now abandoned. Likewise a direct desert road was spoken of between Jandak and Semnan, which was given up some tens of years ago. So also has the old road between Nakshir and Jandak been abandoned. But why? By reason of increasing droughts? No, it is because of dampness that the Kevir is feared. The road is deserted because a temporary winter lake has been formed on its course and in a part which was dry before. If the climate of the Desht-i-Lut had been moister a thousand years ago than it is now, it is improbable that the western parts of this depression, which consist for the most part of kevir ground, could have been crossed. As a curiosity Makdisi's statement, as related by Tomaschek, may be repeated, that it never rained within the walls of Khabis. In our days, a thousand years later, it is said of this district that it seldom rains there.

What is true of the great Kevir is also true of the smaller depressions in Eastern Persia. The kevir deserts, which lie near the large one, for instance, the Kevir-i-Bajistan, and those lying south of the Khorasan road, may be considered annexes of the larger, though their level is not always the same. The great Kevir has a maximum length of 300 miles and a maximum breadth of 150. The area in round figures is 21,000 square miles, or about that of Lake Michigan.

We found that the basin was surrounded by bare, rather low hills, with the solid rock rising out of its own ruins. Here there is nothing to prevent rapid weathering. The differences of temperature between winter and summer and between day and night are very great, and a protective growth is absent. Rain and snow fall in winter, and frosts break up the surface of the hills ever more and more. The products of weathering form the fans of pebbles and blocks at the foot of the hills; they are very flat, and their material becomes finer and finer as the distance increases down to

the Kevir basin, which is filled with fine loam. This loam has at the edge of the Kevir a large admixture of sand.

Round about the Kevir we find innumerable erosion furrows converging to this centre. After heavy rain they may be filled with large rivers, as I had often opportunities of observing during the rainy winter of 1905-1906. That the drainage even now may be very abundant is shown by such erosion furrows as that which descends from the Dom spring to the Kevir, and is 20 yards broad and 30 feet deep. The fine silt carried by the rain torrents finds its way sooner or later to the Kevir, but, as the surface of the Kevir is nevertheless practically horizontal, this must be due either to its constant sodden condition or to the fact that the weathered material, the fine silt included, moves on as a mantle over the Kevir floor. In consequence of the unevenness of the detritus fans the shore of the Kevir is usually a festoon-like alternation of bays and points. Near Turut there are some isolated reefs or pinnacles standing up like islands from the surface. Kuh-i-gugird seems to be a small elevation for the most part surrounded by and imbedded in kevir material.

Even the very latest maps of Persia give many erroneous details of the Kevir. On the map in Stieler's *Hand-Atlas* there are three salt swamps with dotted outlines, the existence of which is more than problematic. The small hilly ridge, crossed by both my routes, does not exist at all. On the map in Andrée's *Hand-Atlas* two quite respectable mountain groups lie on either side of the road between Turut and Aruzun; they have no existence, and it is hard to discover the authority for them. On the map in Johnston's *Atlas* a lake lies immediately to the north of Jandak, and thither in some mysterious way the Kal-mura has gone astray.

Many travellers refer to the basin form of the kevir deserts, their temporary lakes and large salt deposits. Blanford was the first to understand their origin. There are many akin to them in Tibet, Tsaidam, and Central Asia, and they present a peculiar and characteristic desert type. Walther declares that the following causes produce changes in a desert lake: (1) the quantity of precipitation;

(2) the intensity of evaporation; (3) the absorption of water in the ground; (4) the amount of sediment carried to the lake; (5) the salinity of the water. As, now, the amount of precipitation diminished during the Post-Glacial period, the Kevir lake disappeared, or at any rate it entered on a stage in which it was on the verge of annihilation. The volume of water which is now contributed to the basin, either directly by rain or indirectly by rivers, is not sufficient to cover the sedimentary deposits, which therefore are exposed to view. The large salt crusts we find in the interior of the desert indicate a period of abundant precipitation during the most recent period. When larger surface lakes than usual were formed during such moist intervals, the salt was deposited in their beds, and then another dry period caused the lakes to disappear. Undoubtedly, such accumulations have taken place during a very long space of time. Consequently if a crowbar be thrust in certain places in the Kevir through the surface clay, it comes upon a stony salt layer at a depth of a couple of feet. This salt layer has evidently been precipitated in a very considerable lake, and it has afterwards been covered in the course of time by fresh silt. A bore-hole in the Kevir would no doubt reveal a whole series of alternate layers of silt and salt, the latter marking the conclusion of a period of humidity, the former a period of the same character in the main as the present one.

Walther calls the transporting work of the wind deflation, and considers this power as the principal cause of the desert relief. This force has, however, no marked validity in a kevir desert: The horizontal surface form itself shows that the wind is powerless in the long-run. We miss the deeply carved-out wind furrows so characteristic of the Lop country and Seistan, where the tremendously violent winds impress on the clay beds such a fantastic relief. And that there is no lack of wind any one will soon be convinced who travels along the southern margin of the Kevir. On some of the detritus slopes are found quantities of particularly fine specimens of wind-worn stones in bowl-shaped and tetrahedral forms. The winds which have been able to grind down these stones have

been powerless against the surface of the Kevir desert. However hard they may blow they will never in a thousand years change its even surface. The reason is not far to seek. In winter, when the soil is wet and viscous, there is no possibility of deflation and corrasion. In the summer the salt-impregnated loam is dried up into a stony mass, and, even if the wind is then able to do some little damage, the result is obliterated during the wet season. The whole constitution of the contents of the basin must also be taken into consideration, the ground water lying near the surface, the loose, slowly moving material which, in obedience to the law of gravity, is always striving to assume a horizontal position. No superficial changes by the action of wind are, then, noticeable. This fact stands out with the greatest clearness in the Lop country, where one passes from yellow clay deposited in water to the dry *shor* beds where formerly salt lakes lay. The former region is scored with wind trenches several yards deep parallel to the prevailing wind ; the latter is even, untouched by wind, and shows no trace of wind furrows. It must, therefore, have a consistency which presents a great resistance to the sculpturing and planing forces of the wind.

The old religion of Persia, founded by Zoroaster, may, singular as it may appear, afford a proof of the constancy of the climate during two and a half thousand years or more. For, according to the most probable data, Zoroaster lived not long before the rise of the Achaemenid dynasty. According to Justi, this religion, as it is set forth in the Avesta, took the place of the old Magian religion of the Medes. "The teaching of Zoroaster was first fully accepted and developed in Eastern Iran, and in western lands was mixed with foreign elements. The genuine Iranian spirit has always had its stronghold in Eastern Iran, while the western parts of the country were exposed to Babylonian and Greek influence." Night and sleep are hostile powers. By the uprising of the sun the power of demons is restrained ; thanks to the sun, irrigation, agriculture, and other work can be carried on, whereby the extension of desert is checked. "When the desert with its storms smoothes out the roads, so that at night only the bright

stars show caravans the way; when the heat of the sand raises up vapour which envelops the sun in a dense veil, this is the work of the evil spirits which dwell there; nay, even the storm is a *div* which fights against the trees created by God. The contrast between desert and fruitful land is repeated throughout Iran; numerous rivers, flowing through extensive lands with their beneficent water, are suddenly lost in the sand; fruitful land is often closely bounded by arid tracts, and irrigation works lose their effect through the encroachment of the sandy sea."[1]

Such a clearly pronounced struggle between life and death, between good and evil spirits, for the dominion of the earth could scarcely have been conceived unless the natural conditions in ancient Iran had given grounds for it. H. Kiepert expresses similar views: "The effect which the nature of the country exercised on the minds of its inhabitants finds expression in the old Iranian belief in a beneficent creative power, and one hostile to mankind (Ormuzd and Ahriman); as creations of the latter are regarded the hot sandstorms, mirage in the desert, the cold of winter, miasma, noxious insects and snakes, etc.; hence the practical religious precepts ascribed to Zoroaster, the extermination of these creatures, the planting of trees, the construction of water-conduits, the sinking of wells, etc.[2]

Kiepert also points out that the great desert regions in the midst of Iran are responsible for the absence of a general name for this part of the country, as well as for the weakness of the State institutions which have been established in this country since the most ancient times. "Only for short periods have powerful rulers or dynasties, such as the first Achaemenids, Alexander, and the first Seleucids . . . been able to keep it all together; during much longer intervals at least two kingdoms have, as a rule, existed side by side, separated by the great desert, the Medo-Persian, Bactrian, etc." When Kiepert also shows that the small cultivated strip along the southern foot of Elburz has been from the earliest ages the only practicable route between the west and east for large masses of troops,

[1] *Geschichte der alten Persiens*, p. 70, *et seq.*
[2] *Lehrbuch der alten Geographie*, vol. i. p. 52.

and that its importance stands out in every period of military history, we find an indirect but very striking proof of the extension of the desert in former times over the same area as at present. Politics, wars, religions, all have been affected by the geography of the country, and everywhere we detect the influence of the great desert on the life of the people. As long as records go back, the great desert has lain where it still lies, and, on the whole, with the same characteristics as to-day.

CHAPTER LI

THE DISTRIBUTION OF THE SANDY DESERTS OF PERSIA

Let us now take up again the thread we dropped on page 181. It was the question of the localization of driftsand in the Persian deserts. When we were approaching Alem we had a belt of driftsand on our left, that is, to the north, and the dunes rose to 30 feet in height. In Alem I was told that the belt extended for 7 farsakh northwards, where it ran into the Kevir and was lost. North-westwards it was said to run for 9 farsakh, also becoming lower and disappearing. The road from Alem eastwards skirts on the south a huge sandy area connected with the foregoing. It is nothing but a conglomeration of sandhills forming reddish-yellow and greyish-yellow accumulations. Its southern margin is sharply defined and skirted by a belt of saxaul. In other places it sinks into much lower dunes, at most 25 feet high. Another road between Alem and Chupunun, north of the one I took, runs partly through blown sand, partly through offshoots of the Kevir. On the road from Chupunun to Jandak there are always huge dunes on the left; they are as much as 130 feet high. We found the great southern bay of the Kevir on the road from Cha-meji to Tebbes surrounded by pure sand in dunes 100 feet high, partly overgrown with thin tamarisk and saxaul, partly bare. This sandy zone north of the road I followed from Cha-meji to Tebbes is said to extend far to the north-east, past Halvan. The dune area I passed on the way to Aruzun after the eastern crossing of the Kevir may be considered part of this huge sandy zone.

Evidently it is also a southern lobe of this sand-belt

which is touched by the desert road from Yezd to Tebbes, described by Arab geographers. It is divided into eleven day's journeys, and of the seventh from Yezd it is said that it leads to the Rig or sand, a caravanserai and water tank, beyond which sand-dunes follow for a distance of 7 farsakh.

We found equally large accumulations of sand on the south-eastern, southern, and south-western edges of the Tebbes basin. Immediately beyond Pervadeh high yellow sand lay to the left of our road, and to the right, on the north, we had kevir. We could see that the sand became higher and more barren to the south and mounted up any hill slopes that were there. At Dagemashi we found dunes 80 feet high on the south side of the kevir belt that lies there. Then we had the Rig-i-Iskender or Alexander's sandy desert, and to the north-east of it Do-rah-seh-rig or "the three sand-belts of the two roads," and north of it pure white kevir. All the dunes in this country were steep towards south-south-east, evidence of the prevailing north-north-west wind. South of the eastern basin of the Hamun we saw the village of Khamak buried in sand. On our way to the Shela (see below) we were forced by deep sand to make a long détour. At the southern edge of the God-i-zirre basin dunes 30 feet high lay in a considerable belt. South of the Lora-hamun we passed a belt of sand-dunes between Karabuk and Yadgar-cha. Everywhere I found that this peculiar law holds good, and it could not but attract my notice.

On his way south-westward from Jandak Vaughan came after three days' journey into contact with the Rigi-i-chichagun sand-belt, the same that I have mentioned. Two days' journey took him through it, and he estimates the highest dunes at 300 feet, which is certainly too much. I have already shown in several other places, from the experiences of other travellers, the extraordinary regularity with which blown sand occurs in Persia on the southern margins of depressions, unless the configuration and local wind conditions introduce certain exceptions. Jas-morian affords a striking example of a large depression with a huge sandy desert on its south-western border. Of the southern part of the Desht-i-Lut I can find no other

mention than those I have already cited, but of the south-eastern extremity of the desert, between Neh and Bam, Curzon says, quoting Galindo: "Here the prevailing north-west winds have swept the sand together, and banked it up in huge mounds and hills, ever shifting and eddying." Reclus has the following passage: "Dans les déserts du sud-est de la Perse, ce sont les sables qui dominent. Le vent les dispose en monticules qui se déplacent à chaque tempête, effaçant les traces des caravanes, recouvrant parfois les cultures dans le voisinage des fontaines et des ruisseaux temporaires, assiégeant même les villages et les cités."[1] Undoubtedly the south-eastern part of the Desht-i-Lut is occupied by blown sand.

North-north-west of Hamun-i-Seistan is a desert, the name of which, Desht-i-naumid or the Desert of Despair, indicates its character. It extends to the south of the salt swamp Dak-i-petirgun, and seems for the most part to belong to its basin. To the south, where Bellew crossed the desert between the Har-rud and Dorah, it contained, however, no sand. If a sandy belt exists it lies farther north on the southern margin of the depression. On the way to the Har-rud Bellew passed a hill called Rig-revan or the moving sand, after the red sand-dunes occurring here, of which he says that they produce a ringing sound when trodden on.[2]

As regards the town of Yezd in Central Persia we might expect from its situation that it would be menaced by blown sand. The town lies at the southern edge of a long basin, and the north-west wind sweeps the sand unhindered between two hill-ranges in the direction of Yezd. The famous monk Odorico di Pordenone, the first European who visited Lhasa, and during the years 1316 to 1330 travelled through the whole of western, southern, and Eastern Asia, was at Yezd on his outward journey, and gives the following striking description of the sandy belt near the city: "I travelled to a certain city called Iest, which is the farthest city of Persia towards India, from which the sea of sand is but one day distant. Now that

[1] *Nouvelle Géographie universelle*, vol. ix. p. 175.
[2] *From the Indus to the Tigris*, p. 284.

sea is a wondrous thing, and right perilous. And there were none of us who desired to enter on that sea. For it is all of dry sand without the slightest moisture. And it shifteth as the sea doth when in storm, now hither, now thither, and as it shifteth it maketh waves in like manner as the sea doth ; so that countless people travelling thereon have been overwhelmed and drowned and buried in those sands. For when blown about and buffeted by the winds, they are raised into hills, now in this place, now in that, according as the wind chanceth to blow." [1]

The country north-west of Yezd is very similarly described five and six hundred years after Odorico's time. Thus General A. Gasteiger Khan says : "The station Hymmetabad lies in a sea of driftsand, in the midst of which the ruins of numerous uninhabited villages rise up to heaven. Any one who loses himself in the night awakes in another world. . . . The whole country as far as Yezd consists of nothing but sandhills where travellers sinking up to the knee often lose the track. The outer walls of the villages are in many places covered with sand to the top ; in Askezerd I found an old solid castle with ramparts, ditches, colossal bastions, a splendid bath and grand reservoirs all built for eternity and now overwhelmed with sand. The country seems to have been formerly a sea which being dried up by the sun has left this bed of sand." [2]

The same year, 1881, Yezd was visited by Stack. Like Odorico, he makes no mention of driftsand until the second day's journey north-west of the town, where he says, we "wandered for six miles in a sea of sandhills, losing our way twice. This is the sand which by prophecy shall one day overwhelm Yazd. It has overwhelmed old Askizar. The mosque which marked the centre of the old village stands now half buried in the midst of a waste of hillocks that overlie the roofs of houses. The village has shifted farther eastward. In a high wind, such as often blows at this season, all landmarks are lost, and travellers must camp where they stand till the air clears again.

[1] *Cathay and the Way thither*, by H. Yule, p. 51.
[2] *Von Teheran nach Beludschistan*, p. 40.

Whole hillocks of sand will be transported from one place to another when the wind blows hard. We had enjoyed a taste of these siroccos in Askizar, where the courtyard, during the afternoon, was filled with clouds of sand." [1]

M'Gregor also, describing the advance of the sand towards Yezd, says that the advance is of course very slow, but seems to be very constant. Sykes says: "Quitting Yezd, our road ran across a sandy tract, which was, however, cultivated in parts, to Hujetabad where a fine *caravanserai* and reservoir for water had been recently constructed. All around was a sea of sand."

In Southern Afghanistan lies Rigistan south-east of the Hilmend and its great tributary, the Dori. Rigistan signifies sandy desert. We have here an example of sand in Eastern Iran accumulating not only south of depressions but also south of rivers. We find the same disposition in Turkestan, where the sandy desert Muyun-kum is situated to the south of the river Chu, Kizil-kum south-west of the Syr-darya, and Kara-kum south-west of the Amu-darya. It is the same in India, where the great Indian desert lies south-east of the Indus and Sutlej. In this region northerly winds prevail, at any rate in winter. Walther considers that these masses of sand come from the sandy silt on the flat left banks of the large rivers. Thence the sand moves in the form of broad deserts south-westwards, and advances like an encroaching sea over the level plains. He gives the rate of advance as 20 feet a year. "Another source of desert sand is the bottoms and shores of lakes with a fluctuating level, and also the bottoms of dried-up lakes."

In Eastern Turkestan, also, we find large masses of sand on the south and south-west of rivers and lakes Tarim and Lop-nor. Roborovski describes the sandy desert Ak-bel-kum, which extends along the southern shore of Bagrash-kul. The sandy desert Kum-tag, which, according to Obrucheff, has been piled up by the prevailing north-easterly and easterly winds, lies to the south-west of Kalachi-nor, where the river Buluntsir falls into it. The same explorer found the old beds of the Hwang-ho south of Khara-narin-ula

[1] *Six Months in Persia*, vol. ii. p. 4.

covered with blown sand, and he believes that the sandy expanse to the south-east derives its masses of sand partly from central Mongolia through the action of the prevailing west-north-west and north-west winds, partly from the dried-up beds. Potanin supposes that the south-west winds prevalent in Ordos carry blown sand from the Nan-shan all the way to the Kinghan mountains and Kerulen.

Particularly interesting is Potanin's observation that the sand of the desert belt in the northern half of Asia is almost without exception piled up round lakes, and consequently in the lowest parts of the depressions where it occurs. "Moreover, we find also that these sandy tracts always occur on the western or south-western shores of lakes; this is the case with the lakes Balkash, Ala-kul, Ebi-nor, Ajar-nor, Orku-nor, Sajsan, Ulun-gur, Ubsa-nor, Durga-nor and Khara-nor lying to the east of Kirgis-nor."[1]

From Tibet, where driftsand is very scarce, I will give only one example. On the southern shore of the Bashkum-kul and the stream which flows into this lake lies a very large belt of absolutely barren high dunes. Volumes might be filled with such examples, not only in Asia but also in Africa and other parts of the world.

It is too well known to need repeating that dunes are a function of weathering and the energy of the winds. A dry climate and a barren soil are also conditions for the production of dunes. If now all conditions are fulfilled, if weathering proceeds unhindered in a desert region unencumbered by vegetation, then the accumulation of driftsand and its movement must take place in different ways, depending on the character of the winds. If the prevailing wind is north-easterly, as in Russian Turkestan, the whole sandy waste moves south-westward. This is also the case with the immense collections of dunes I have described in Eastern Turkestan. If the wind blows from a different quarter in different seasons, the relief only of the dunes is changed, but the sandy area remains stationary. Dunes

[1] In the first and second volumes of the *Scientific Results of a Journey in Central Asia, 1899-1902*, I have fully described the sandy seas of Central Asia, and I refer those who are interested in them to this work. I have also in the English translation introduced the result which the Russian explorer arrived at. The complete account will be found in vol. ii. pp. 380 *et seq.*, from which the above excerpt is taken.

are known in north Africa which have been confined to the same place as far as historical records go back, a conclusion which may be inferred from the names of the wells. Foureau says, in his excellent description of the great Erg in the Sahara: "Dans tous les cas, l'avancement des dunes ou, pour mieux spécifier, l'augmentation de leur volume, ne se produit qu'avec une extrême lenteur, et cette lenteur ne peut provenir que de la variabilité du régime des vents, car si l'on se trouvait en présence d'un vent régulier, constant, il est certain que l'avancement et l'accroissement se manifesteraient très rapidement. Il y a donc lutte entre plusieurs aires de vent, et leur résultante n'est que d'intensité faible, ce qui vient prouver clairement qu'un vent déplace le travail et modifie le résultat des efforts de l'autre."[1] Foureau concludes that in the region of Africa he visited winds of the southern quadrant are stronger than all the others, and that therefore the movement of dunes takes place towards the north, though extremely slowly.

We find a region of very rapid extension of dunes in Eastern Turkestan, where I discovered in the year 1896 two towns entirely overwhelmed in sand, which were abandoned centuries ago, and have since been the object of thorough investigation by M. A. Stein. Huntington holds that the dunes of Seh-kuheh are only two or three hundred years old. Walther speaks of small single dunes in Turkestan which can move 65 feet in one day during a violent continuous storm.

It may often be difficult to detect whether a sandy expanse is moving or not. When northerly winds prevail over the Kevir, one would suppose that the sand-belt on its southern margin must move southwards. But such is certainly not the case. The sandy zone on both sides of Alem is sharply limited on the south, and saxauls grow there on level clay soil on the leeward side of high dunes. To the north the sandhills are said to begin immediately from the level surface of the Kevir, as is also the case north of Aruzun. But if one is on the lee side, that is, the southern, of this sand-belt in a strong wind, one feels the

[1] *Documents scientifiques de la mission saharienne*, vol. i. p. 224.

blown sand beating into one's face. I suspect, therefore, that such a sandy zone as this comes into existence only under certain conditions of wind and configuration of the country, and that when these conditions cease to exist, the blown sand can no longer gather into dunes. Granted that the area constantly receives additions from the north, and that the blown sand sweeps over the crests of the dunes, still these do not increase appreciably, for when they have attained a certain height their tops are blown away again by the wind. And the sand skimmed off the last row of dunes passes on southwards to form dunes at perhaps 100 miles or more away, where again the necessary conditions are present.

That, on the other hand, such a zone of sandhills as lies to the north-west of Yezd is in a state of motion, seems beyond doubt. It is proved by the ruins already mentioned, which are now buried in sand. About these sands Floyer expresses himself as follows: "After leaving Yezd, I crossed at about 10 miles north the very extensive remains of ancient Yezd, buried in sand; and it appeared reasonable to think that the present Yezd was gradually being buried, but the process was so slow, if indeed it was going on, that no one could give me any information on the subject."[1] Large areas around the town are, according to Curzon, full of ruins, and in his opinion the sand is encroaching from the east. It seems, however, as if this belt of dunes is moving towards the south-east, following the main direction of the valley, though the local wind conditions may force the sand to settle on the eastern side, where it is sheltered by the walls. The existence of ruins need not, however, be a proof that the town was formerly much larger. The houses are built of sun-dried bricks and clay, and if a quarter of the town is invaded by sand, it is deserted and the people build new cabins and houses on clear ground in the neighbourhood. Yezd is a wandering town persecuted and hunted by the sand.

This is what Marco Polo says of Yezd: "Yasdi also is properly in Persia; it is a good and noble city, and has a great amount of trade. They weave there quantities of a

[1] *Unexplored Baluchistan*, p. 354.

certain silk tissue known as *Yasdi* which merchants carry into many quarters to dispose of." Fifty years later Odorico found Yezd to be "the third best city which the Emperor of the Persians possesses in his whole realm." According to Curzon, the town contained at the beginning of the eighteenth century 100,000 inhabitants, in the years 1860-1870 only 40,000, and in the year 1890 about 70,000 or 80,000. During more than 600 years no progressive diminution can be detected, but certainly periods of prosperity and decline. If the driftsand constantly encroaches on the country in the same way as in the interior of Eastern Turkestan in former times, the town must equally constantly contract and at last disappear altogether. Whether this is the fate which awaits Yezd can only appear in a distant future.

If, then, a system of dunes moves forward in a definite direction, it can only be under the influence of the prevailing wind. If it is stationary, this is the resultant effect of winds from several different quarters. In steppe districts lying near an area of blown sand small sandy ridges may often be seen heaped up to leeward of all the shrubs. Even the smallest obstacle is sufficient to give origin to a rudimentary dune. In such a steppe an unbroken law is observed in the arrangement of the sand; all the small ridges are parallel to one another.

But how remarkable and unexpected is it that the same law obtains, one may say, in the whole of Asia! Naturally there are exceptions depending on local wind conditions. In the innermost parts of Asia winds are seldom experienced. But when we find the Takla-makan, the greatest sandy desert of the world, west-south-west of the Lop-nor depression, where we know that the prevailing wind is east-north-east, and when we find immense accumulations of sand south of the Hamun-i-Seistan depression, where an exceedingly strong north-north-west wind is prevalent, we can take it for granted that in other tracts the position of sandy desert reveals the existence of prevailing winds which may be only just directly perceptible or not at all, but of which the character may be inferred from the position of the sand.

When we, then, find in Eastern Iran sand on the southern sides of enclosed basins we may hence conclude that northerly winds predominate. On A. Buchan's wind maps of the world we find the following prevailing winds given for Iran[1]:—

January	NW. or N.	July	N. or NW.
February	N. or NW.	August	NW.
March	N.	September	NNW.
April	NW	October	NW.
May	NW.	November	NW.
June	N.	December	N.

Accordingly, winds from the northern quadrant prevail throughout the year in Eastern Persia, and therefore all doubt is removed as to the cause of the driftsand's distribution. As regards the great Kevir in particular, it is hardly possible to entertain any other conception but that the belt of blown sand on the southern margin is fed by material from the weathered hills on the northern boundary of the salt desert, as well as by the sand which forms so large a constituent part of the Kevir soil. This, however, is only attacked by the wind during the dry season, for when the Kevir is wet the wind is completely powerless. The prevailing winds may be assumed to have been the same as at present for endless ages past. Weathered material for the maintenance of the sandy deserts has not been wanting. It is the third factor, the configuration of the country, which determines the extent of the sandy area. Over level plains, where there are no obstacles, the dunes move on and are succeeded by new sand formation. Such is the case in the Kizil-kum, Kara-kum, Takla-makan, and Rigistan. Where hills stand to the south of the sand-belt they offer resistance and set bounds to the extension of the desert. This is the case in all the depressions of Eastern Persia. The crescent-shaped sand-belt on the southern margin of the basin is constantly fed by fresh blown sand carried thither by the wind over the level floor of the basin. But as much sand is carried away to contribute in other places farther south to the progressive filling up of

[1] *Report of the Scientific Results of the Voyage of H.M.S. "Challenger," 1873-76*, vol. ii.

the basin. The zones of dunes we now find on the southern edge of the depression will then lie where they are for all future time, for there, and there only, are all conditions of their existence fulfilled. Only as weathering proceeds and the hills, which now check the winds and the farther movement of the sand-dunes, lose their effect, can the sandy belts have an opportunity of gaining ground. The sandhills on the coast of Baluchistan are certainly not appreciably larger at present than at the time when Alexander's warriors lost their baggage waggons because the wheels stuck fast in the loose sand.

CHAPTER LII

WE PART WITH OUR CAMELS

Just as we were making ready to set out from Neh alarming reports reached us from Seistan, where the *nakoshi* or bubonic plague had of late raged furiously, and people were dying like flies. Officials and Europeans had fled to some *kuhistan* or highland country, and the people in Neh pitied us because we were going into this dreadful plague centre. I wished to telegraph to Nasretabad, the chief town of Seistan, for surer information, but the telegraph station was not working. In Neh we came into touch with the line which, from Seistan, runs through Birjan and Haidari to Meshed and Teheran. Wondering whether I should land in Seistan in a more critical situation than in Batum, I set out on the morning of April 1, and at a distance of one hour from Neh had an intimation that something was actually going on, for there stood a lonely quarantine tent, where travellers from Seistan had to remain five days for observation. With the five days in Bendan, there were then actually ten days' quarantine on the road to Neh. But the watch was exceedingly defectively and negligently kept, and it was the easiest thing in the world to escape quarantine by avoiding the guarded roads.

We had taken two Neh men into our service, and hired five camels from them. One of them was terribly fractious, perfectly wild, and had to be curbed by an iron chain. The two men were armed with long primitive guns, which they carried over their shoulders, but they were soon tired, and hung their weapons on the camels, and then had a less martial appearance.

Followed by beggars, we proceeded on our way past mills and forts, with their decayed mud walls and swampy moats filled with water. Two small villages, some surface canals with water, and extensive fields of growing wheat were soon behind us, and we were out in the wilderness again. To the left stood an isolated hill, the Kuh-i-Shah-Dost, and beyond ran the small range Kuh-i-germ. To west-south-west was seen a sandhill field called Rig-i-Neh, which apparently consisted of quite high barren dunes. We came at a sharp angle to the range Kuh-i-esten, and passed Khuneh, a squalid and desolate village, with the ever-present yellowish-grey walls and fields, the ruins of a fort, and eleven mills built together. An old woman sat meditating in a courtyard, and a ragged boy followed us for a while, but there was no other living thing. And then we were out in the silent wilderness again.

The day gave promise of being warm, and at one o'clock the temperature was 74.3°, but the clouds gather together again into a close canopy, and there is a strong wind from the south-east, from the plague-smitten land. I sit dreaming on my tall camel, and we draw near to Seistan with a certain uneasiness, my servants being much disturbed by the news we have received. They are engaged as far as Seistan, whence they are to turn back; but now they ask me whether it is dangerous for them to go there, and I answer them that they may be quite tranquil. How singular that the black death can find its way hither, to this silent, peaceful wilderness! It is so sparsely peopled that one would think that the angel of death would pass by it. And yet he finds his victims—the peasant in the fields, the woman who vainly covers her face, the labourer who is stricken during his heavy work. We involuntarily feel solemn on approaching a country ravaged by the plague. Every telegraph-post we leave behind, every beat of the caravan bells, takes us a step nearer to the answer to the questions which disturb us all.

Our road leads us among fragmentary hills, and we cross two small saddles. The rocks are dark-green porphyrite, close dolomite-like limestone of a light-red colour, and reddish-grey, fine-grained sandstone. The first pass has a

height of 3858 feet. From the other the view is extensive towards the east, and shows the lie of the land; but we do not care to enjoy it for long, for just about the summit a whole cloud of small irritating midges buzz in our ears and torment us with their sharp bites. In the afternoon the air becomes strangely thick, and the hills show only in hazy shades of varying density. The mist seems as if it came in from a sea and lay over fringing reefs.

We encamped at the well Cha-i-kurgez (3186 feet), where a caravan of horses and donkeys were already. The men had made a ring fence on the windward side with their bales, which contained tea and tobacco. The bark of dogs in the distance showed that there were other human beings in the neighbourhood. When the wind died down at night we were badly teased with midges, beetles, moths, and other winged insects. It was too warm to keep the tent closed, with 65.8° at nine o'clock; but we had descended during the day, and come nearer to the sultry, unhealthy country.

67.3° at seven o'clock on April 2 foreboded a warm day, and at one o'clock the temperature rose to 83.5° in the shade. The air was heavier and thicker than ever, and we could only get a very indistinct notion of the surrounding country. But there was not much to see. Dreary and monotonous, the steppes, desert zones, ruins of hills, and drainage channels alternated as heretofore. The rocks were conglomerate and sandstone, composed of weathered porphyry, and here and there penetrated by veins of calcareous spar. In a hollow begrown with luxuriant tamarisks the clayey soil was much sodden, and we waded and splashed through the yellow slime all on foot. The tamarisks grew on small cones, and only near them, that is, where their roots made the ground somewhat stable, could we get along, the difficulty being to pass from one tamarisk to another, while the camels were nearly drowned in the quagmire. At the mouth of a small valley a small brook had formed large pools, where I sat and splashed my boots about to clean off the clay.

A little farther two men sat dreaming at a hill while their horses grazed. They were armed to the teeth, and

declared that this district was rendered insecure by Baluchi robbers. We had travelled far enough, and encamped (3615 feet) in their company, and were entertained by their lurid descriptions of the progress of the plague in Nasretabad. The day had been so oppressively hot that it could scarcely come to an end without some atmospheric disturbance, and at four o'clock came a violent south-west storm, stirring up dust and soil, whining and moaning, and accompanied by a short but refreshing shower. Late at night the rain pelted down, and almost dashed through the tent, dropping and trickling through the canvas, and the temperature sank to 39.4°.

On April 3 we awoke to our last day's journey with the old camels. The morning was quite cool, only 60.1°, and Abbas Kuli Bek surprised me with a brazier, a luxury that had been discarded. At a knoll near the camp a *sengab*, or rain-water pool, had been discovered in a stony hollow, and two skins had been filled with sweet water from heaven, the more needed because the water of Bendan was said to be brackish.

And then I mount again my trusty steed, and he carries me eastward between ragged hills, pinnacles, and jagged summits of sandstone, and at last of limestone. The sky is clear, not a breath of air is felt; the smoke from my cigarette remains floating motionless behind me like small light-blue balloons. It will surely be a warm day. Yes, 80.6° at one o'clock, and the heat in the calm air makes itself felt acutely. The warm moisture lies like steam over the ground, and, together with the soil soaked by the rain, produces an odour reminding me of a hothouse.

Through swarms of troublesome flies and biting gnats we turn north-eastwards, and enter a picturesque winding valley, where a small brook hides itself among the pebbles at the bottom. Every minute or two our direction changes, and I have always to keep my compass ready. My hands are occupied by the map, and I cannot defend myself with them. It is worst where tamarisks grow in dense clumps, for there the poisonous insects seem to be in millions. Sometimes I make a raid on them. They sit in hundreds under the brim of my felt hat. It is little use, for if I kill

one there are a thousand in its place, but revenge is sweet. I forget both the heat and the plague in the presence of these small, infamous pests, which buzz in my ear, small black specks with disproportionately large wings, and it seems as if nothing could be worse than the unbearable irritation caused by these innumerable minute stings. To-day it is like a baptism of fire, an inoculation with poison; later we shall become less sensitive.

The country opens out again, and we keep on eastwards over steppe slightly strewn with gravel. Several small villages appear, and the whole district bears the name of Deheneh-i-Bendan. On the right hand is an offshoot from the hills, and when we double a promontory we see, in the very mouth of a valley, the village of Bendan, with its charmingly quiet and dreamy palms. Nothing can be prettier than this sight. It is so long since we have seen palms, and hence we take a double delight in their dark, fresh verdure. Under the shadow of the palms our train advances in the usual order, and the bells ring solemnly and heavily. But this time we did not wander with impunity under the palms, and when we halted beyond the small fort and the silent graveyard, and Meshedi Abbas made my old riding camel kneel down, I did not know that this was the last time that the faithful animal would ever carry me over deserts and hills.

We encamped on the bank of the Bendan river, where the slightly brackish water rippled so pleasantly before our tents. The height was 2572 feet, and therefore we had descended more than 1000 feet during the day. It was no wonder that the heat was more sensible. Near by, a large building had been erected for travellers from Seistan, who had to stay there five days under observation. Beside us was the reception-tent of the Hindu doctor, Abbas Ali Khan, where all travellers coming from the east were examined. He received us kindly, invited me to dinner, and told me that the plague had raged terribly in Nasretabad, twenty deaths occurring daily, but that now the epidemic seemed to be passing off. Those who died were chiefly poor people, who also suffered from want. There were no suspicious cases in the Bendan barrack, but the

242. The Brook at Bendan.

243. Hill at Bendan.

doctor advised us to be very careful. Cleanliness was one of the surest safeguards against the disease.

I warned my men to wash themselves daily, and had scarcely finished my speech before a general bathing followed. Abbas Kuli Bek was first seen standing in the brook stark naked, giving himself douche after douche with a pail. Then Mirza came up in very light costume, and in a few minutes the whole party was splashing in the water. Meshedi Abbas alone, who had his own hygienic principles, considered the new regulations extravagant, and contented himself with watching the others bathe. Then it was the turn of the clothes, which were washed, beaten, and wrung on the bank, and in the evening my men decorated the tent-ropes with them.

At dusk I betook myself to the tent of Abbas Ali Khan, where the officials of Bendan were already assembled. There was the telegraph master, Mirza Ali Khan; the Governor's *Kafile-bashi*, or caravan inspector; Agha Muhamed, the chief inspector of the quarantine house; and an Armenian, who was on his way to the customs-house in Seistan. The dinner consisted of excellent Persian pillau, eggs, and bread, nor did I miss my usual fowl.

The Hindu doctor said that Seistan is naturally a rich, fruitful, and well-watered country; but the people are poor and down-trodden, for they are squeezed by the Governor of Meshed. In Persia the office of governor is farmed out to the highest bidder. The Governor of Meshed pays the Government 150,000 tuman a year for his post, and to make up this sum, and as much more for himself, his Excellency squeezes his province most disgracefully. Such a governor naturally promotes the spread of pestilence. The poverty he causes among the people renders them more liable to disease. He would be hanged in the name of humanity if there were any justice in this iniquitous world. But he takes care of himself, and the Government must have its 150,000 tuman. The worst is that all the leading men in Persia deserve hanging, for as the country is now managed it must advance quickly towards complete dissolution and ruin.

The conversation turned to the fate of my camels, and as I now had the most important men of the place around me, I asked them for advice.

"Yes," was the answer, "if you wish to get your camels through Seistan at this time of year, you must not be too rash, or they will be eaten up by gadflies; there are some here in Bendan already, but in Seistan they are worse."

"Then it is too late in the year to lead them through Seistan?"

"If you go quickly through the country without stopping at Nasretabad, you can get them safely through to the frontier at Kuh-i-Malek-i-Siah; but if you stay only two days in Nasretabad, they will be quite ruined by gadflies."

"The worst is," cried another, "that your camels are from the north, and they cannot endure the heat of Seistan; you will at any rate be obliged to sell them before you commence your journey through Baluchistan."

"How do you intend to take your camels over the Hamun?" asked the doctor. "There is no possibility of getting them across the water without long détours."

Now the Kafile-bashi raised his voice and said, "If you like, I will see after the sale of your twelve camels. You must sell them in any case, and Bendan is the last place where it can be done."

"Is there any one in Bendan who is willing and can afford to buy them?" I asked.

"I will take them," he answered.

"How much do you offer?"

"I can go up to 450 tuman for the whole caravan."

Should I really consent to such a wretched bargain? I called out at a venture, "Six hundred tuman!"—it was really not the money that mattered, the trouble was to part from the animals. But after the account of the gadflies I had no choice—I had known these infernal brutes at Lop-nor. The only service I could render my faithful camels was to save them from Seistan and a heat which they had never experienced. They were accustomed to work only at night and in colder districts, and not one of them had been even as far south as Bushir. It would have been

cruel to force them through a germsir and through swarms of gadflies.

After long bargaining, we agreed on a price of 500 tuman, and the Kafile-bashi offered to pay 400 in silver, and to give me for the remainder a horse which was worth 100 tuman. But I have always been afraid of horse-dealers and I said that I had no use for the animal. He yielded, and agreed to give me the whole sum in silver, and thus the wretched business was concluded, but I had a lump in my throat all evening.

Before the sale was finally transacted I went, however, to our camp and talked with Meshedi Abbas, Gulam Hussein, and Abbas Kuli Bek. They heartily approved of the transaction, which was a striking proof of unselfishness, and removed my suspicion that each hoped to receive a camel as a present. It was their opinion that if we could take the animals to Seistan they would not fetch more than 300 tuman, especially if they were eaten up by gadflies; and the strongest and largest would succumb first. It was decided that we should remain over the next day to complete the nefarious business, and the Kafile-bashi undertook to procure us six hired camels to the lake; we did not want more, as we had no longer to think of the transport of camel fodder.

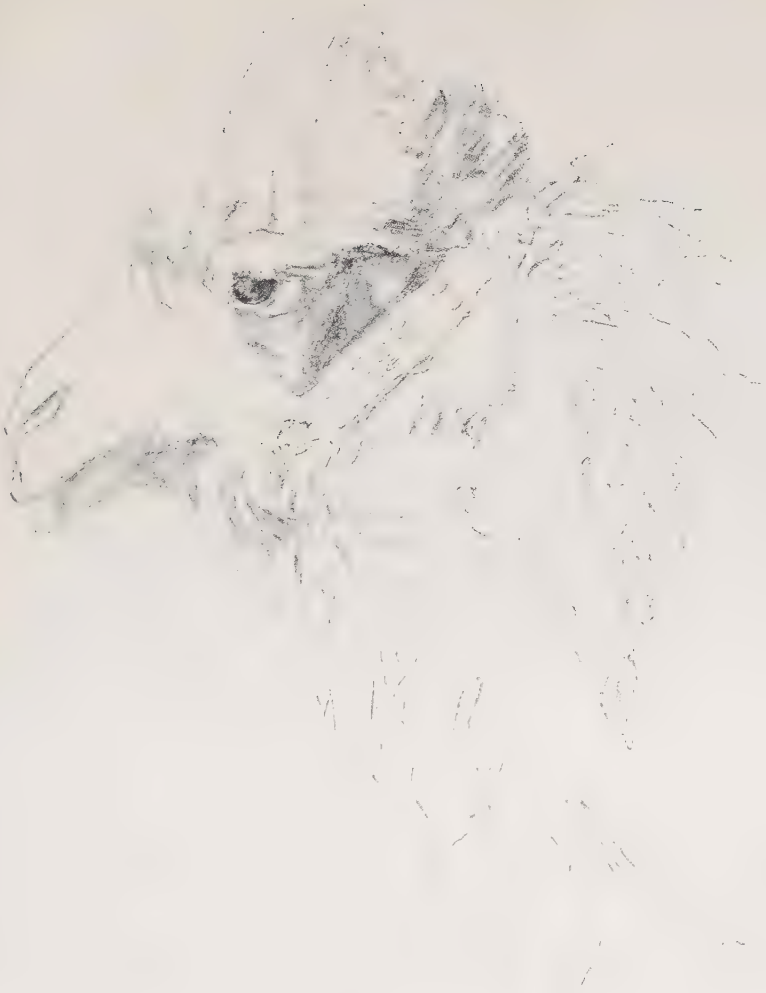
Late in the evening I went to pay a farewell visit to the camels, who lay, suspecting no evil, in two groups round their heaps of straw and cottonseed. I patted and caressed my old bearer, and he put out his shaggy head towards me, and looked at me with his large brown eyes. He was seven years old, and Meshedi Abbas said that he had ten years' more work before him—I wondered how many I had myself. I scarcely dared speak, lest my voice should tremble, as all the men stood round me silent and sad. The lantern threw a pale yellow light over the group of men and animals. I had had this great head in front of me for three months—it seemed an endless time since we left Teheran. Gulam Hussein said the camel understood that he was sold and would in future belong to another owner. He understood his hopeless state, and only wished he could speak and beg to remain with us, in spite of all

the gadflies in the world. But Meshedi Abbas thought differently, that the camel knew nothing of his fate. In the morning, when his new owner and his servants came to lead him and his eleven comrades away, none of our men following, he would at length understand that all was over, and that our ways were parted for ever. And then honest Abbas embraced the camel, and kissed him on his mouth.

The camels were all in very good condition, and could, without difficulty, have returned by the same road to Teheran. Only one of them had a small sore on his back, which would quite heal up during the summer. Meshedi Abbas deserved every credit for his excellent management. Now they would be led on the morrow to the highlands of Kain, where the pasturage is good, and there they would be turned loose for fully four months. When their new wool had grown they would commence work again on the caravan roads between Birjan and Meshed. They would go to Yezd and Teheran, to the coast of the Caspian Sea, and to the shining minarets of Ispahan. Ah, what weary, heavy travel awaited them! With us they had been well off, but new experiences would soon make them forget us. It was not hard to leave these vast silent deserts, their palms, villages, and forts, for now I had them down in pen and pencil in my books. To part from men is also easy. After I have gained an insight into their mode of life and have learned to know them thoroughly, and after they have received their money, I give them a last hand-shake, and off they go to meet new fortunes. But to say farewell to camels with their unbounded faithfulness is terribly hard ; it is such a sin to leave them carelessly, one feels ungrateful and perfidious, and one's heart aches with thinking of it.

All the bread that money could buy in Bendan was purchased, and was given late in the evening to the camels as a grand banquet, and I portioned out the loaves myself as long as the store lasted. They enjoyed the bountiful repast, and no doubt wondered in their own minds why it was that they, poor working camels, were fed so gratuitously with bread.

" Well, whither do you think yourselves of taking your



244. The Last Portrait of my Riding-Camel.

way from Seistan?" I asked my men, though I was not ignorant of their plans, as I could not help hearing their conversation in the tent and during the long marches.

"We intend to travel to Meshed in thirty days, and then in twenty-five to Teheran," answered Abbas Kuli Bek for himself and the others.

"Will no one go with me to Nushki?" I asked.

"If the Sa'ab orders us, we will go with him; but we are afraid of the heat and the plague, and also wish to keep together."

No one seemed to wish to go back from Bendan, though I could very well have found other men for the two days' journey to Nasretabad. Their fear of the plague was therefore not great, and they were not cowards. The Cossacks had orders to turn back at Seistan at all events, and even if the other men had been willing to accompany me to Nushki, I should not have kept them. I was approaching another country, and I preferred new men who were acquainted with the locality.

We left the camels, and retired to our tents, while the jackals howled more mournfully than ever. The night was quiet and warm, not under 59°. Insects were heard buzzing in the air, and it was pleasant to hear the ripple of the brook. To the east the Hamun awaited me with its waterlogged swamp; there were burning heat, gadflies, scorpions, and tarantulas; there prowled the black death, going about and seeking its victims among the children of men. Here in Bendan our camp was pitched for the last time with the sold camels, and the complaining and mocking howl of the jackals broke the silence of night. We could not, therefore, feel in a jovial mood in Bendan, this beautiful little oasis with its royal date palms and purling brooks.

I was awakened by such an unbearable heat in the tent that I threw everything off me and called for cold water, stripped myself entirely, and put on thinner clothing. At noon the weather changed suddenly, a strong, south-westerly storm arose, clouds of soil and dust swept along the ground and into the tent, and even the palms which stood so near were lost to sight.

Agha Muhamed came with the silver and notes and paid the amount to the last farthing. My men insisted that he should pay extra for the pack-saddles, halters, and bells, but I let him have all the paraphernalia into the bargain. I was afterwards vexed that I had not kept the largest bell as a remembrance of the long journey through the desert.

At five o'clock everything was settled, and Agha Muhamed's men came to lead away the camels. We went out and patted them farewell, and with moist eyes watched them disappear beneath the palms. They stalked along quietly and proudly, but turned their heads to look at us, and Meshedi Abbas declared that they knew very well that they would never see us again. Soon the ring of bells died away at the little cliff, and our camp seemed small, empty, and desolate, when the camels were no longer in their usual place.

CHAPTER LIII

TO THE SHORE OF THE HAMUN

The minimum temperature at night was not below 61.3°, but when the thermometer on the morning of April 5 marked 67.1° it felt nice and fresh in consequence of the steady north-westerly wind from the hills which blew straight into my tent. The jackals had been out, and had played the mischief with a quantity of roghan, which stood outside by the quarantine house, and belonged to a caravan from Seistan. Thirty prisoners lay there awaiting their release—they were in *garanti*, as the Persians pronounced the word quarantine.

I had telegraphed the day before to the English Consul-General, Captain Macpherson, and received a very kind answer, bidding me welcome and stating that orders had been sent to the shore of the Hamun with regard to our passage over the water. The Hindu doctor received a fee for consultation on the plague question, and then we marched out of the trumpet-shaped valley mouth like a bay in the sea with diverging hills on either side. Far in the south and south-east were seen solitary rocky islets, which we had left behind us before evening, and we seemed really to be approaching an open sea.

We follow the bed of the river. It is sharply cut, and is as much as 10 feet deep. Before us, along the road, is seen a long row of telegraph-posts, and in the clear air I can clearly discern 29 of them; but farther on they run together into a thin line pointed like a needle in the distance. It is quite calm and burning hot, and a couple of light white clouds float only in the south-east.

After noon the heat was modified by a rapid southerly wind which stirred up the dust and hid the hills; and even the valley mouth at Bendan, which had just before appeared as a slight dip in the hills, vanished behind us. The small clouds grew larger. They did not come sailing from any particular direction, but increased where they were, growing out of nothing. But afterwards they passed away again, and the sky became clear once more.

We march quickly down over the waste. We have thirteen camels, for I now let my men ride, and, besides, we have two animals in reserve. My new riding-camel is surefooted, but I miss my old friend. A trusty fellow who leads our train tells me that our old camels seemed perplexed and astonished at first; but that when they had been led before sunrise to good pasturage, a farsakh above Bendan, they were quite content, and "by this time they are stuffed full," he adds.

The road is the largest and most trodden we have seen since Veramin. Here many men and caravans have travelled along it in the course of time. Now also we meet two parties of wayfarers, preparing to pass the night at a covered tank which is full after the last rain. We have rather a prejudice against these wells, now that the plague is in the country, and all travellers from Seistan halt at them.

Now and then comes a warm breeze, which raises the temperature to 85.1°, and it feels desperately hot, but I know very well that I could bear 20° more. The country becomes still more level, and only the light and easy gait of the camels shows that we are going down. Half-way we have descended to 2322 feet, and at the evening camp to 2156 feet. We cross a line of flat banks and terraces, which cannot be anything else than old shore lines of the Hamun. They are intersected occasionally by dry beds, which at times carry rain-water down to the great flat depression. The highest of these beaches lies about 490 feet above the present surface of the Hamun. Where we halt on the steppe the grazing for camels is scanty, but on the other hand the air and ground swarm with all kinds of insects, with and without stings. I have to keep my tent closed

against their intrusion, especially at supper, when the single dish is peppered over with them.

Next day we march on farther towards the lake. The country before us is exceedingly level, and the horizon is quite flat, for the last small elevations are behind us except in the south-east, where a very low table hill is seen, Kuh-i-Khoja. To the east-south-east there is a brightness as of a highly-polished damascened blade. It is the lake, and we seem to be almost on a level with its surface. We again cross a row of terraces and a very considerable torrent bed, which receives all the smaller channels in the neighbourhood. On its bank a wolf stands gazing. The dogs are after him like a shot, but he is too quick for them. In the neighbourhood is a little *rabat* or shelter called Bereng, a well with brackish water, but it cannot be seen from our way. At ten o'clock the air still feels fresh, but the wind blows from the east, and is cooled in passing over the broad sheet of water.

It is trying to the patience to go towards a sheet of water in a flat basin, for we march and march and yet we seem no nearer. Now we have travelled two and a half hours straight towards the lake, and yet the scene has not changed. A row of very small terraced mounds running NNE. marks the limit of the lake's possible extension in its present state. The gravel thins out and comes to an end, and is replaced by flat yellow silt which has cracked in drying. And then at last we are on the shore of the Hamun, with waves seething on its light-green water. Down here it is quite pleasant, with the thermometer at 69.1°, and the water is $4\frac{1}{2}$ degrees warmer than the air, and is quite sweet. But the lake is bare and bald, and there is no sign of vegetation. The nine observations I took gave for the Hamun a mean height of 1680 feet.

After staying a while for breakfast and enjoying the splash of the cool waves, so strange to us, we followed the shore to the east-south-east. It afforded an excellent path of bare, hard silt, dry, yellow clay. We passed a camp of lake-dwellers who had pitched their tents in a long row along the beach. To the right, a few miles off, was seen a minaret, called Mil-i-Nadir, or "Nadir's mark"; it is

visible like a pole for a long distance over the flat country. On all sides, except where the lake is, sterile, greyish yellow plains extend, flat as a pancake. Sometimes flat islets of mud just emerge from the water, and in two places we pass lagoons which are bounded towards the lake by small strips of clay. To the east the Hamun seems boundless, no shore being visible. Sometimes we move away from the lake, again returning to its irregular coast-line.

In the afternoon clouds spread over the sky from the south, taking away the direct rays of the sun, and we have no cause to complain of the heat. A little later dense clouds float all round, it rains on Kuh-i-Khoja, and the wind blows freshly from the east. The clouds become denser and closer, changing from grey to dark purple, and show tinges of yellow and red, and we suspect that a storm is on its way. We have water to the right as well, and we are evidently on a peninsula and are to begin our navigation from its extremity. Camps and tents are seen in several places, and sometimes the shore is dotted black by cattle—the cows seem to be all black in this country, with white spots on the head and their tail tufts white. Some of them are lying in the water, so that little more than their heads are visible, thus protecting themselves from gadflies and other bloodthirsty insects. But what do they live on, for the ground is quite bare and grey, and no verdure is in sight? Perhaps they eat the root-stalks left after last year's growth of reeds. In a creek a whole herd is grazing, where, doubtless, the spring shoots are budding forth. A village of twenty-two tents and huts is on the left. When the wind falls occasionally we are pestered with flies, gnats, and midges.

Another village of twenty tents was passed, constructed of straw matting, and we encamped just beyond, on the shore. The weather was such that I could not draw or photograph; but, accompanied by Abbas Kuli Bek, I made a round through this simple gipsy encampment to gain at least a superficial notion of it.

The tents are not of cloth but of matting made of reeds which is laid over and tied fast to a frame of small poles. They are therefore made in quite a different style from the

24. Men and Bark Huts.

huts of the Lop people, which are more permanent, and are set up on spots never reached by the water. But here on the shore of the Hamun the people must always be ready for sudden changes in the water surface, and the encroachment of the water on the flat land under the influence of wind and atmospheric pressure. The people said, however, that they knew by experience the signs of the sky, and could withdraw in time to safe ground. When the shore is dangerous they take down their tents, roll up the matting, and flit in haste to another shore.

In every village the tents are arranged in a row, all fronting the same way. Three or four stand close together, but between these groups are small open passages. Inside the tents are kept clothes and vessels, and milk and prepared milk foods are kept in jugs and cans. Household utensils, tools, and implements lie in confusion, and outside half-naked or stark-naked children play among sheep and large, shaggy, light-coloured dogs. A girl, clothed in only a shirt and a blue bandage round her unkempt hair, hurries off on sturdy legs to the cattle. The herds are led out in the daytime to places on or in the lake where beds of reeds grow. In the evening they are driven in to the camp to be protected from the wolves which, it seems, are very numerous. The women do most of the work and milk the cows, and milk food of all kinds is their principal food. Fish also are caught in nets and are eaten, and ducks and geese are caught in snares, just as at Lop.

Yes, everything reminded me of the Lop country, even the weather which prevailed on this our first day on the shore of the Hamun. At five o'clock a strong north-easterly wind swept over the level country and the lake, and soon rose to half a gale. The troublesome gnats and flies which had just been tormenting us in large swarms vanished in a moment, but instead the tent was invaded by dust and rubbish which danced along in eddies. The air was thick and dark, and it was even too cool to sit in shirt sleeves. I was told that such winds are common every year at this season, and that sometimes a storm would last three to eight days. Probably it was a forerunner of the *bad-i-sad-u-bist-rus*, or the wind of 120 days. The people

distinguish between the bad-i-Khorasan or north wind, and the bad-i-Keble or west wind. Both these bring rain, while the south wind, it seems, is clear. They have also observed that a continuous wind exercises a strong influence on the extent and depth of the lake, for the water falls to windward and rises to leeward. The country we had traversed this day would, in such case, stand under water for twenty days, and the depth at our camping-ground would be as much as 2 feet. Such parts of the ground as are never flooded, being a little higher than the rest of the country, are called *lurg*. In ten days the water would reach to Mil-i-Nadir and Burch-i-Abbas-Rehan, but as these places stand on terraces they are not flooded.

The lake, then, is variable, like Lop-nor, but within narrower limits; and while alluvial deposits and wind erosion, as well as the extraordinary flatness of the country, are the true causes of the wanderings of Lop-nor, it is really only the distribution of atmospheric pressure and the supply of water which determine the changes of the Hamun. To the south "the water is lost in the sand," as the people expressed it, and by a southerly détour Nasreta-bad can be reached. To the north, on the contrary, there is no way round for Europeans, for the Afghans close the road to them.

In the evening we had a visit from some natives who offered us sweet and sour milk. But we took the Hindu doctor's advice and came as little into contact with the people and their wares as possible. They said that if it did not blow so hard we should be quite killed by gnats. For themselves they were almost insensible to the bites of insects, but strangers suffered severely.

It felt quite cool with 61.7° at nine o'clock, and an hour later I lay on my tent-bed watching the diffused moonlight playing on the fluttering canvas. At midnight I was awakened by a strange noise. The two boxes which were placed on the hem of the tent on the windward side to keep all close and steady had been blown over by the wind, and all the things, the candlestick with its glass shade included, which stood on my improvised table, lay scattered on the ground. The wind blew right in, and the tent

246. Women and Reed Huts.

canvas flapped and beat, and the tent was firmly anchored only at the four corners. It howled and whined in all crannies, and nothing could be heard but the noise of the storm, while the sand and dust rained down on me. I tried in vain to make myself heard. But the wind came to my assistance and roused up the men when their own tent was torn up from its moorings and carried away. Then they noticed my exposed state and came and packed me up again. It was one of the most violent storms I had ever experienced, and the velocity was certainly as much as 80 feet a second.

It was not easy to get to sleep amid the roaring noise, and I lay expecting the tent to fall down on me and wondering where the myriads of gnats had gone to. They are so fragile, and here there is no shelter; they must have flown in all directions, and those that remained must have got their tender wings broken. After midnight it rained heavily, and there were puddles of water on my box lid in the morning.

The air was unexpectedly clear, and after a minimum of 44.2° it was cool. Avul Kasim was clothed in a fur coat when he came to wake me with the news that it was quite winter again. The wind was due north, the wind we had often heard of which turns the mills, and if it continued, as at present, it must make everything spin. The clouds at the same time sailed north-eastwards.

Meanwhile we accepted the condition calmly, though we had not expected that we should feel any coolness down here so late in the year. We were delayed because the men, who were ordered to fetch us with their *tutins* or canoes, were not to be heard of, and no wonder, for the great open lake was too lumpy for their fragile barks.

It was late in the day when our *tutindar* or canoe-man turned up and said that the lake could not be crossed. The canoes are constructed of bundles of rushes tied together and combined into a large raft which has considerable buoyancy. But in such weather as we had that day we should have had whole seas over us, and the canoes would have been torn asunder bit by bit, so that the boxes and baggage would have been lost, and we ourselves

exposed to great danger ; for though these boats are made as strong as possible, yet they bend and heel over in the waves, so that the bundles of rushes part. The man had plied across the Hamun for six years, and never lost anything, and would not run any risks, for he was responsible for the travellers' effects. But if the storm continued for two days he would build two large *tutins* of a more solid make. He did not advise making the voyage by night, for there was no moon, and if the canoes grounded on banks they would go to pieces. We had, therefore, to exercise patience and wait.

Three courses run across the Hamun. The one we were to take is called Rah-i-torotki, and is reckoned 2 farsakh long. It was said that this course had not had water more than twenty days, and before that it was quite dry, for the Hilmend was then lower than usual, and the rain had been slight. This year, however, the supply of water had been so abundant that the swamp was expected to be full all the year round.

The second route is called Rah-i-surkh-gezi, and the third Rah-i-Shah-rud. This last, where the telegraph line runs, is so shallow that it is not navigable by canoes, but can be used by camels and other animals, though caravans do not cross at this time of year.

While we stood talking on the shore we could see the water rapidly gaining ground and spreading out at the rate of perhaps 6 feet in half an hour. In order to observe its progress we set pegs at the water's edge and watched the water penetrate into all the small holes and shallow hollows. The strong northerly wind was, it was said, driving the water southwards, where large areas round Kuh-i-Khoja would be flooded. But if the wind suddenly abated the water would flow back northwards, the flooded areas in the south would be laid bare again, and our tents would be in danger where they stood now. The Hilmend now carried down vast quantities of water daily, which spread over the shallow lake basin. Later in the day, or during a space of five hours, the water had extended 92 feet beyond our marks. The lake, therefore, expanded very quickly in our direction.

In the morning we had seen men driving cattle in long dark columns out to the shallow parts of the Hamun, where there was grazing; and far out in the swamp these men went about cutting off the soft, juicy sprouts from the reeds to feed the calves which do not leave the camp. During this work they protect their noses, cheeks, and mouths with a corner of their head bandages, but their legs are bare, and it must be cold splashing in the water by the hour when the air temperature is not above 56.8° as it was that day at one o'clock. At the shore the water was at 64.2°, but it was colder farther out.

I visited a village to the north-east, consisting of thirty-nine reed tents or huts of matting; or what shall we call these airy dwellings? In this village they were tunnel-shaped. A framework of twigs and laths formed an arch. The mats were about 40 square feet in area, and were tied fast to the ribs. At the sides of each cabin, and especially at the outside of each group of four huts, bundles of reeds are set up vertically to give shelter both to man and beast. The huts are no doubt thus set up close together, partly to mutually support and strengthen one another, and partly to form a larger sheltered space. They have all their openings towards the south, and this, too, shows that the north is the prevailing wind.

The matting is manufactured in the same way as in Central Asia. A man takes a bundle of 20 or 30 hard yellow stems, cuts them to the same length, about 6 feet or more, lays them on the ground, and stamps on them till they split up. Then he picks out the long small fibre, strips off the leaf sheaths and bits, and plaits them into mats in a moment. The huts are at most 10 feet broad and 13 feet long, but usually are smaller than a small tent.

The animals pass the night in front of the huts, and are driven out into the swamp again in the morning, the manure scattered on the ground is collected, turned, and broken up to dry. A fire burns at the opening of each hut, which is fed solely with dung, and round every fire is a ring of cleaned and split fish, which are toasted in this way. Bunches of newly caught fish hang in the shade of the huts among rags of clothing and implements. It is very dirty

in these airy dwellings, where mothers nurse their naked children, while others turn handmills, churn butter, prepare sour milk, spin thread or sew clothes. A small withered hag sat huddled up in a corner, and looked as though she were a hundred years old. She was stone blind, could not walk, and sat crouching on her bed on the ground, a nest of vermin. The younger women were good to look at, were unveiled and inquisitive, brown and dirty, and lightly clothed in rags. They had dark-brown eyes, large noses, thick lips, with down on the upper. They wore simple ornaments round the neck and a coloured bandage round the head, but all were barefooted.

In one or two of the huts hung a long clumsy gun; they are generally used for swans. In front of two dwellings stood looms of the simplest construction; very coarse cotton cloth is woven in them. Russian cotton cloth in gaudy colours, imported from Meshed, also finds a ready sale at the Hamun.

It was very amusing to go and look about among these singular communities, which live on cattle-breeding, fowling, and fishing, and where everything vividly reminded me of Abdal and Kum-chapgan. One would think that this people must be better off in all respects than the poor peasants in Eastern Persia, who depend on the harvest they can coax out of the niggard earth; but the people of the Hamun themselves assured me that they were very poor, each hut owning not more than six or ten cows. To judge by the large herds one sees, the average per hut must be larger. It was also admitted that there are households which own as many as a hundred cows, but these were all from Seistan. A man from Meshed was now staying here to buy cattle, and had already obtained 49 head, for which he had paid 25 to 30 tuman. He said that he was going to take them to Meshed in 35 days, and that he made a profit of 3 kran on each cow. In reality his gain was much greater, but he would not let it be known when sellers were standing round listening, for then he would have had to pay more next time.

Later in the day, when the wind was falling, I returned once more to the huts to take photographs. The inmates

were then more reserved, the men having come home with the cattle and dogs, and I could not obtain permission to photograph any of the younger women. They passed the evening at the doors of their huts facing the setting sun. This day it had been stingy with the heat it usually pours liberally over this watery country, a contrast to the dry wilderness we had so lately crossed. The natives sat and rested, smoking and busying themselves with their fishing-gear and household utensils, talking, and visiting one another; and they were indescribably simple and ignorant, this poor people whose sole resources are cattle, fish, and water-fowl.

And then we saw the mails, in a skin bag, carried over to Nasretabad. They must be forwarded, unless the weather puts quite insurmountable obstacles in the way. The waves were still high—even in the lee of the shore the canoe had not gone far before the billows dashed over the frail vessel. The mails must be well packed up to reach their destination in tolerable condition. The canoe, however, disappeared across the water, the wind pushing on behind. Two other canoes, which came to the shore heavily laden with fish, had great difficulty in getting through the breakers. A woman went out into the lake to meet them, and was laden with the catch like a camel.

My men were already impatient at the delay caused by the wind and weather. They were longing for home; they were eager to get away from the plague-stricken country, and to reach Imam Riza's tomb in Meshed. They would thank the saint for their deliverance, yes, they would for once enter under the gilded cupolas—Inshallah!

In the evening there was a strong wind again, but the sky was clear, and at nine o'clock the thermometer marked 47.5°. The moon rises surrounded by a bright halo, beneath which the lake glitters like a silver streak,—a shining and immovable boundary between heaven and earth. Only the wild geese pass over it, as just now, in a flock of perhaps 200, following with piercing screams the water as it rises towards the east-south-east. We, too, go to rest, hoping to glide next day over the open sheet of water.

CHAPTER LIV

A LAKE VOYAGE

On April 8 I was awakened with the news that the wind was still blowing hard, but the air was clear, and the sunshine played on the glittering surface of the swamp. It was cool after a minimum of only 41.2° in the night, and I had still cause for astonishment that the summer heat delayed its coming.

Now a whole flotilla of new solid tutins had been procured, and the ridiculous vessels lay moored a short way from the shore, made fast to their punting-poles. A score of men carried our things to the water's edge, where the fragile boxes were tied up in matting and wrappers and carefully conveyed on board. They were distributed, a box or package on each tutin, the most valuable box on my own tutin, while Abbas Kuli Bek and Mirza were responsible for the other two. We required fourteen vessels, each manned by a steersman. On the flagship of this frail and comical flotilla, that is, my own tutin, the commander also, the *tutindar*, took his seat. We tramped out barefooted for 200 yards from the shore, where the boats lay, and could be laden without coming into contact with the bottom. We purposely kept them as light as possible to avoid grounding on the way.

My tutin was the largest of the lot, nearly 20 feet long, and amidships, where it was broadest, it measured nearly 4 feet. Seen from above, it had the appearance of a pinnace or gig, but all the material consisted of long dry handfuls of soft yellow rushes (*tut*), which were bound together in very stout bundles. To give the vessel sufficient buoyancy

247. On the Shore of the Hamun.

248. Through Thin Reeds.

many such bundles must be fastened together, and, when loaded, a much larger part lies below the surface of the water than above. My tutin took the ground at a depth of $15\frac{3}{4}$ inches. Two bunches of rushes tied along the edges ran from the bow backwards to a distance of a third of the boat's length from the stern, and served as a gunwale. They also prevented the baggage from slipping overboard.

Very lightly clad, and with naked legs, the steersman stands in the stern and manages the vessel with skill and agility. He stands facing forward, and sets his long thin pole against the bottom and throws all his weight on it, turning almost right round to give the greater pressure and force on the boat. The last thrust before the pole is pulled up from the bottom gives the greatest impulse to the boat.

We—myself and my six servants—went on board, each on his tutin, and steered out on the lake in rough water, with tumbling waves to larboard.

Close to the shore the lake is shallow, muddy, and open, but soon reeds in thin beds appear, and then we glide carefully and noiselessly along a canal 13 yards broad, through closer reeds. This passage is kept open for traffic between the eastern and western shores, the reeds are burned during the season when the lake is dry here, and then the new growth is uprooted, which threatens to grow up and block the channel. Here one voyages between hedges of reeds. The surge is smoothed down by them, the strong breeze is not felt, and we are immediately surrounded by swarms of midges. But the reeds are by no means so close and compact as in Lop-nor. The water is half clear, and runs in a very perceptible current south-south-west. We can observe it by the small ripples formed round every reed stem. It is the water of the Hilmend coming from the north and flowing southwards and south-westwards in the direction of Kuh-i-Khoja, where the ground is now being flooded foot by foot.

After an hour's journey the depth increases, but never during the whole passage of $3\frac{1}{2}$ hours sinks to $6\frac{1}{2}$ feet, and the places where the depth is 5 feet are comparatively

narrow. At first we have firm land on our right. There is seen the reed-built village of Peren-i-murtesa.

At about half-way we are met by a tutin, with a Persian servant of the English Consulate, bringing a very kind letter of welcome from Captain Macpherson. We therefore halt on the light-green water, while I read the letter, and hurriedly write an answer and hand it to the messenger. His boat turns round, and soon disappears at a rapid pace among the reeds. A little farther we meet a whole flotilla of rush boats, placed at our disposal by order of the Consul. They, too, turn round and follow in our wake. An amusing sight are all these small vessels, scarcely rising above the water, and forced on by their boatmen! And the voyage was cool and pleasant, and I should not have minded if it had been ten times as long. The wind was refreshing, and, as a rule, kept the stinging insects at bay, and at one o'clock the thermometer stood at 55.6°, though the sky was quite clear.

Now we glide through narrow passages, now over open sheets of water. The reeds out here are rather thin, and the yellow stalks of last year seldom stand more than two feet above the water. The fresh young shoots have scarcely reached a foot in height. Yellow predominates, and green is still very thinly sprinkled among it. Kuh-i-Khoja stands up a huge, flat, table-like landmark on the right, and the reeds are so thin that they seldom hide the hill completely. As a rule, however, we are surrounded by reeds on all sides, sometimes near, sometimes at a distance, and hence we seem to be passing along quite a narrow waterway. The dogs are deceived by this appearance, and jump in under the impression that they can swim to dry land, but they soon find out their mistake, and, tired and panting, make for the nearest tutin, where they are taken on board, dripping and ashamed. They keep quiet in future, but howl and whine piteously, and seem to think the whole voyage a disagreeable episode.

The lake opens out again, and the waves splash merrily against the larboard gunwale, and there is a cool spray, but no danger. Now and then wild geese scream. Every-

249. On the Open Lake.

250. Part of our Flotilla.

thing, the whole character of the place, the whole landscape, reminds me of Kara-koshun and its large swampy lakes in the Lop country.

Now we enter a yellow channel again. The water is very muddy, and seems as though it came direct from the silt-laden Hilmend.

On the last stretch to the eastern shore no reeds are growing, and here we cross a very extensive, quite open bay, like a large lake. The depth goes down only to 20 inches, and the water is exceedingly muddy and full of stems and fragments, because a herd of cattle has lately been here, tramping on their way to or from a lake pasturage. Before us, to the east, is seen a row of huts, towards which we steer. On either side of them are cattle, an immense crowd of black specks, a whole chaplet of animals. The land is so low that it is invisible until we are close to it, and therefore the cattle seem to be moving over the horizon of the lake.

When we neared the shore, and the depth was only 16 inches or less, the boatmen jumped off the tutins, and pushed them on to a point about 20 yards from the land. The huts, which lay about 30 yards from the shore, were just then being taken down by their owners. We saw the people packing their things, rolling up the matting, and taking down the poles. They feared a rise of the water, and were flitting to safer ground north-eastwards.

We set up our camp in the immediate neighbourhood of the moving village, and were there actually surrounded on all sides by water, for eastwards lay a very narrow, shallow water channel, like a claw surrounding the small space of dry ground where our tents stood, but it was thought that there was no danger of flooding before night. A number of snail shells of the same species as at Lop lay thrown on the shore.

The commander and crew of the flotilla were paid for their good work, and immediately disappeared over the lake westwards. We had found these tutins remarkably practical and trustworthy boats. In speed and facility of manœuvring they cannot compare with the canoes of the Lop-nor men, but on the other hand they can stand a

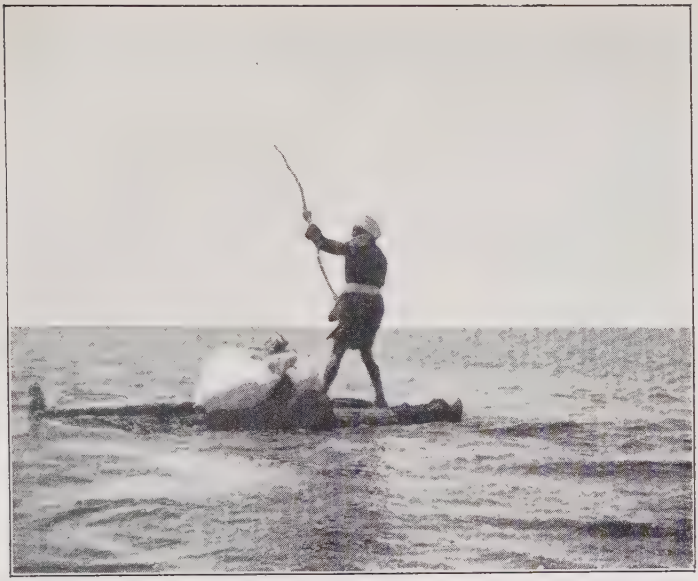
much rougher sea. If they are only bound together strongly enough, they can ride through almost any sea, for, owing to their construction, they cannot fill or sink. Even if the waves break over them, they still lie as high out of the water, while a Lop-nor canoe fills in quite moderate waves.

From our camp a continuous expanse of water of very wide dimensions is seen to the east, north and all round to the north-west. This is the great Hamun. From north-west to south-south-west is visible a light-blue elevated outline, the high country we have lately crossed, and which forms the western boundary of the Hamun region. The distant highland tract seems to rise directly from the surface of the water, but that, of course, is only an illusion. Almost all round the line of the horizon seems as though drawn with a ruler, and only here and there huts, beds of reeds, and grazing animals form small inequalities.

The lake is, as we have seen, extremely shallow, though it may be taken for granted that there are deeper hollows outside the line we followed. But it is very extensive, the water spreading as thin as paper over large areas of this alluvial land, and the water is everywhere sweet. The whole Hamun is, as it were, an expanded mouth or a flooded delta of the Hilmend, just as Kara-koshun is an inland delta of the Tarim.

The shore where we stayed lies exposed to the north wind, and as this abated the water sank, though only a small fraction of an inch. One would have expected a heavy surf on the shore, but nothing of the sort was observable. This is owing to the reeds, which in some places act as a breakwater. When the northern wind drops altogether, the water returns northwards in a slow swell, to cover again the beaches swept dry by the wind.

We encamped early, hoping that the new transport animals would turn up before evening, but not a sign of them was seen. We kept an outlook in vain, and waited on our miserable island, where we had not a stick of fuel after the last wooden box had been sacrificed. We were also badly off for provisions, and even the tea and sugar



251. The Steerer's Attitude on a Reed Canoe.

252. Approaching the Eastern Shore.

had come to an end; but fortunately there was still some flour, and later in the day we procured three fowls and a dozen eggs. So we were saved from hunger.

On April 9 the temperature was 52° at seven o'clock, and the usual cold northerly wind whistled and moaned outside. There was not a cloud in the sky; the hills in the west were brightly illumined by the sun, but appeared in very feeble tints, and only Kuh-i-Khoja was as sharp in outline as the day before. The small village had disappeared, with the exception of one hut, where children screamed in rivalry with a monotonously humming hand-mill. There had been no danger of a flood, for during the night the water had retired fully 33 feet from my mark. The land is so flat that a fall of barely more than four-fifths of an inch is sufficient to lay large areas dry.

From lack of caravan animals we still remain prisoners, and have to wait. My men stand looking south-eastwards for a long time, and the field-glass passes from hand to hand, but the black specks on the horizon are only grazing animals.

At last! At nine o'clock Abbas Kuli Bek reports that a caravan is coming, and a little later some of the servants of the Consulate arrive, with fifteen mules and some riding horses. All our belongings are hoisted up quickly; we mount the horses, and off we go to meet with English hospitality in a plague-stricken country.

With the large open water of the Hamun on our left, we rode over a marshy peninsula, and then followed a dry, winding path to the village Afselabad, where we called to our aid six *bellad*, or guides, who knew every detail of the intricate waterways, and where the best fords were situated. As I had my own six men, as well as twelve from the Consulate, there was no danger for the baggage, and even at the worst places we could pass through dryshod.

We had first to cross three broad delta arms of the Hilmend, which carried swiftly-running water, even forming rapids, and very thick with soil and slime, washed down from the wind-swept plains so lately dry. Then followed a large swampy lake, with very shallow water, and narrow,

flat strips of still exposed land. The worst was that the bottom was marshy and soft, so that the animals sank in deeply at every step, and I was much concerned for my boxes, which contained the valuable results of the journey, notes, maps, sketches and photographs. But the villagers were like fish in the water. One of them went in front on foot and examined the way, and the others steadied the boxes on either side of the mules, being particularly careful when the animals trod unusually deeply into the mire.

Then came a stretch of dry ground running in the direction of the road in a long, narrow peninsula, at the point of which a canvas boat from the Consulate lay awaiting me. But the watermen said that it was not wanted, so it was left behind, and I followed the caravan over a large flooded area, where the depth was at most 3 feet, and the bottom usually firm and hard. To the right was a long, narrow strip of land, here and there broken through by small passages. These are the western delta arms of the Hilmend, coming down from Bend-i-Seistan. This great, open water also streams visibly to the west and north-west. All got over a deep, treacherous hollow safely, except Abbas Kuli Bek, whose mule fell, so that the rider got a thorough ducking.

Then follows firm, dry land of fine grey clay, scored by wind furrows running north and south, of just the same kind as in the Lop desert. Next we ride between green tilled fields, and the last bit of ground is barren. In front of us appears the capital of Seistan, and we approach this plague haunt with a certain feeling of awe. To the left stands Nasretabad, within its wall, and to the right the sister town Husseinabad, where the flag of the Russian Consulate waves on its lofty pole. A broad, open street or market-place leads up to the portal of the court of the English Consulate. In the midst of the large quadrangular court, where it is vain to try to make anything grow, stands the Consulate, a long stone building, in a simple, practical, Oriental style, with a verandah or a colonnade on stone pillars around it. At the principal entrance the Consul, Captain Macpherson, comes out to bid me welcome, and in a few minutes I am installed in my fine apartments,

253. Animals at the Shore of the Hamun.

254. A Corner in Afselabad.

amid all the comfort it is possible to wish for in this remote corner of the world.

Six Englishmen, without ladies, were staying in Seistan, and with them I spent nine memorable days. Englishmen have a knack of making themselves at home in whatever part of the world their lot may cast them, and even here in this wretched Nasretabad they lived much as in London. They did not come unshaved to luncheon in the great saloon, and at dinner they appeared in spruce attire, with starched shirts, dinner jackets, and patent leather shoes. And then we sank into the soft armchairs, and took coffee, with prime cigars, and, while the gramophone reminded us of the divas and tenors of the great world, whisky and soda were served, and we talked of Iran, Tibet, and the plague. We were in high spirits; and it was difficult to believe that all the while the angel of death was roaming about in search of his hapless victims.

CHAPTER LV

THE PLAGUE

Who has not heard of the Black Death which spread in the fourteenth century from its original home, Asia, over Europe, devastating enormous stretches of country, and even in certain parts of Sweden almost exterminating the population? From certain old-established centres in the Old World this terrible epidemic seems, time after time, fortunately at long intervals, to have found its proper soil in human bodies, or rather the conditions under which men lived in certain districts were favourable for its propagation, and it spread slowly but irresistibly over wide areas. About twenty years ago China suffered from such a plague period, and in 1894 the disease reached Hongkong, and afterwards spread westwards to India, where it remained for a series of years. Especially in 1896 and 1897 numbers of people in India were carried off by it, and during nine years the plague had seized as many as three million victims.

But with regard to the plague and other great epidemics which have their roots in Asia, a wide field is open for all kinds of speculations. Are plague and cholera necessary evils, a means in the hand of nature to check the too rapid increase of the human race upon the earth? And if the number of human beings increases in the course of time, will these epidemics and their ravages increase at the same rate? It is a triumph of science to be able to check and suppress the spread of pestilence by means of serum; but is it an advantage to the human race as a whole that a natural weeding out should take place from time to time? The plague last raged in the seventeenth century; for more

than 300 years the germs had lain quiescent. Why did they become active now and spread among men and animals over so large a part of the world? These and many other questions relating to the plague are still unanswered.

Now Seistan was having its turn. As far as was known, and there was every reason to believe it to be true, the first case occurred in November 1904. Then the epidemic spread during the winter with such virulence that the Indian Government despatched a doctor with Hindu assistants to Seistan, partly to observe the disease on the spot, partly also, and more especially, to do all that was possible to prevent it spreading westwards. For if from Seistan it got a firm hold of Persia, Europe also would be in danger.

The physician chosen was Captain Surgeon Kelly, who had been shortly before General Macdonald's staff surgeon on Younghusband's memorable expedition to Lhasa. During my stay in the English Consulate I had then an inexhaustible subject of conversation with Captain Kelly. He gave me much interesting information about Tibet, and much advice which was afterwards of great service to me. But what, under the present circumstances, was more interesting to me than anything else was to listen to his experiences of the plague in Seistan.

The belt of reeds round the Hamun is called Nesar. In that part of it which lies north-west of Nasretabad lives the Seiyat tribe, the members of which do not marry outside their tribe. It was among them, in November of the preceding year, that the first case of plague occurred, in the village Deh-Seiyat-gur, where a cowherd, Meshedi Hussein, sickened and died.

Captain Kelly had marked down all the villages where cases of plague occurred on a large-scale map, and had also put down their dates. By collecting notices from all directions and corners he had been able to follow the geographical distribution of the plague, and he called the village just mentioned its primary focus. From this it spread in three directions,—east-north-east, south-east, and south-south-west.

Two Belgian gentlemen, in the Persian service, were

then superintending the Persian customs on the frontier of Baluchistan. They were also officially instructed to assist in checking the plague. After several difficulties they succeeded in their endeavours. They persuaded the inhabitants to burn the clothes of the dead, their huts and household furniture, in fact, everything that had come in contact with those who had been stricken by plague or died of it. In return, they distributed new clothes to the heirs, and provided them with means of building new reed huts. By these means they stopped the plague in its progress in two of the above directions.

In the third direction things were worse. The plague was carried by thirty-eight fugitives from Deh-Seiyat-gur to Pusht-i-Kuh-i-Khoja, where thirty-five of the fugitives died after letting loose the microbes in the latter village. The corpses were buried, not in the village, but in a burial-ground between it and Deh-gurg, situated farther to the east. A mollah and several relations from Deh-gurg attended the funerals, and on returning to their village carried the infection with them, and also infected all the camps and villages on the way. The village Pusht-i-Kuh-i-Khoja is inhabited by Seiyats, but, unlike their northern fellow-tribesmen, they marry outside the tribe, particularly with the inhabitants of permanent villages in the delta country on the east. Therefore their connections came to be present at the interments. Pusht-i-Kuh-i-Khoja became, therefore, a secondary focus from which the plague continued its victorious march through the country. The small, poverty-stricken village Deh-gurg had only 170 inhabitants, and of these 150 had died at the time of my arrival in Seistan, but yet the 20 survivors remained in the dreadful, infected village. Before I left I heard that these 20 were either dead or had left, and Deh-gurg was empty and desolate.

Deh-gurg became, then, a third focus, whence the disease spread northwards to Daudeh, if this village did not receive a secondary immigration of microbes direct from Pusht. At any rate, the village had 450 inhabitants, among whom the plague raged most horribly. The people were opposed to European ideas, and permitted no preventive

measures. Therefore most of them died. According to one version, the infection was carried to Daudeh by a peasant who had been to Pusht to buy feathers and wild-fowl.

When the epidemic had spread in all directions and threatened the whole country, and when whole villages had died, the authorities were induced to draw a cordon of several hundred soldiers round the infected area to localise the pestilence, and cut off all connections. But Persian soldiers are well known. They had as little conception of the danger as the rest of the people, and did not obey their instructions. Two of them betook themselves to the unfortunate Daudeh, and ate their dinner in a house where a man had just died of plague. Both died. What can be expected of other people when the guard, instead of stopping the disease, contributes to its spread?

Furthermore, the soldiers soon grew weary of this service, and wanted to go to their homes in Eastern Persia. The authorities thoughtlessly gave way, and granted their request, and thus the whole country was exposed to danger. We afterwards heard reports of cases of illness in Turbet-i-Haidari, but they fortunately turned out to be exaggerated.

The plague reached Pusht in the beginning of January. Now, when the cordon of soldiers had been removed, all Seistan lay open to the disease which spread by invisible means in all directions from village to village. At last it reached, three weeks before my arrival, the twin town Nasretabad-Husseinabad. Owing to superstition, suspicion of Europeans, and a reluctance to give an account of themselves and their affairs, Captain Kelly had met with great difficulties in his attempt to trace in detail the paths of the disease through the country, and many reports he had been unable to check. Nevertheless, he had been able to follow its progress in the main, and his plague map was of exceptional interest and of the very greatest value as a contribution to our knowledge of the disease. The villages on the lower Hilmend were still untouched, but they are separated from the infected country by an uninhabited region.

Captain Kelly said that no better geographical con-

ditions for hemming in and localizing an epidemic could be conceived: the river to the east, to the north and west the Hamun, and a desert on the south. Here the evil would be as in a rat-trap if all entrances and exits were blocked. In the worst case the whole population might perish, but what were a hundred thousand persons compared to all Persia? And if the plague came so far the whole world would be opened to it, and no one could tell where it would end.

One question Captain Kelly, with all his zealous efforts, investigations, and inquiries had not been able to answer, and that was, How did the plague come to Seistan? How did the infection first reach Deh-Seiyat-gur? Seistan was surrounded on all sides by unaffected country, and Karachi more than 600 miles distant was the nearest plague-stricken place. Three routes only were imaginable: by land, water, or air. By water it could not come, for the Hilmend descends from invigorating highlands, and its water remains in the Hamun. It seems that it could not have come by caravan, for the people of Deh-Seiyat-gur were poor, and bought no goods from Hindustan, and, besides, a caravan takes nearly two months to travel from Nushki to Nasretabad, and if it carried the disease, places on the road would be infected, which was not the case. Infection is not carried through the air, for in India it is found to spread quite independently of wind.

There remain, then, birds of passage, and it was on these that Captain Kelly's suspicions rested. He thought of the ducks and geese which fly from India to Seistan, perhaps after coming into contact with a corpse thrown into a river. But here another difficulty arose: wild geese and ducks fly north-westwards from India in the spring, and the first case of plague occurred in November. It is possible that the infection was really introduced in spring, but was not propagated till autumn.

Selfish and thoughtless men worked in the interests of the devouring bacilli. The famine which prevailed everywhere enfeebled the people, and rendered them more liable to disease. Under ordinary circumstances large quantities of the grain harvest are bought up by a few rich persons,

who then raise the prices to many times the value. The scarcity now prevailing was due in great measure to the failure of the crops in Kain, and large quantities of grain had been sent thither from Seistan, so that the country itself came at last to want. All the poor people, that is, the majority of the population, must either starve to death or support life with soft reed shoots and other plants, and had thus to struggle for life for six weeks more, till the new harvest was ready.

As the unscrupulous rich speculators were deprived of their profits, they stirred up the people against the Belgians, and circulated false reports about them. They asserted that they burned the Koran, and that they burned clothes and dressed the people in new ones, in order to get hold of nicely dressed women, that they did everything to spread disease, exterminate the people, and render it easier for Europeans to take the country.

Then there were the *mushtehids* and mollahs, the literates and priests who also backed up the movement, and fanned the discontent and distrust. They were afraid lest the people should bestow their confidence on Europeans and unbelievers, and they themselves should lose their influence over the masses. We Europeans were justified in hoping that one or two high ecclesiastics would be attacked by the plague, so that the work for the benefit of the people might proceed unhindered.

Meanwhile these wretches succeeded so well in their wicked purpose that the mob, prompted by hatred and ill-will, made an attack, on March 27, on the Belgian hospital, which was burned down. Then nearly 500 fanatics rushed to the English Consulate, where they behaved in a barbarous and extravagant fashion. Captains Macpherson and Kelly went out to pacify them, but were received with a shower of clods and stones. Then the dispensary was broken into, and all the vessels containing medicine were broken, as well as everything in the shape of furniture, tables, doors, and cupboards. Fortunately, as it happened, the serum tubes were kept in another place. One fellow climbed up on the roof to stir up and incite the rest, and the peace-breakers did not withdraw till some revolver

shots had whistled through the air. The Consul, Captain Macpherson, sent at once a mounted messenger to Robat in Baluchistan to fetch assistance, and the troops sent to Nasretabad were still there on my arrival.

The immediate consequence of the attack was that the distribution of medicine ceased, for the drugs had been destroyed. Before, all the sick who presented themselves had received medicine gratis. The people, therefore, began to see how foolishly they had behaved, and their displeasure was directed against the instigators and leaders of the riot.

After that they had been obliged to look after themselves; but in the English Consulate preparations had to be made for another attack. The large store of provisions which usually lay in the warehouse, where it could be easily stolen or set on fire, was moved into the main building. This could soon be turned into a fortress, and from the flat roof, surrounded by battlements, the court would be exposed to fire in case of an assault. The guard of the Consulate consisted only of twenty Indian cavalry soldiers, but they were, like the six Sahibs, well armed.

One must, however, forgive the misguided and ignorant people who, brought to despair by famine and plague, knew not what to believe. They could not understand why Europeans, without reward, nay, with considerable sacrifice to themselves, came to their aid with advice and active assistance. They could not believe that it was simply from feelings of humanity and philanthropy. And when their own educated men and priests assured them that Englishmen laid out trade roads in Baluchistan solely to introduce the plague into the country, and that under pretence of distributing medicine they only spread poison, it was certainly no wonder if the poor people were irritated. Moreover, they saw how they themselves were decimated, while the Europeans were immune—not a single European was attacked by the plague. The Governor, Mir Mohsin Khan, ran about like an idiot from village to village, flying from the plague, and the colonel of a regiment intended, it was said, to remove to Kuh-i-Khoja, as if the plague could not reach him just as well there. A recrudescence of the plague and famine might at any moment produce a general

panic, and the frenzy would, first of all, vent itself on Englishmen. Therefore, it was evidently necessary that a large quantity of provisions must be stored in the Consulate, and even this might be a temptation during famine.

Under normal circumstances the small double town has 7000 inhabitants, 2500 dwelling in Nasretabad and 4500 in Husseinabad. In these two closely-packed, insanitary, poor, and dirty communities, the Angel of Death had now established his headquarters. The day before my arrival 35 cases had been reported, 10 of which resulted in death. On April 10 there were eleven deaths; on the 13th, 13; on the 14th, 15; and the plague seemed to be making progress. The reports were, of course, not made up till the following day. On April 17, 8 deaths were reported after eleven o'clock on the same day. But the natives themselves hardly ever reported the deaths of their relations and friends. In the English Consulate information was obtained by means of spies and from merchants from India. The burial-grounds were also watched, but this means was little reliable, for the natives, expressly to conceal deaths, buried the corpses anywhere, and the interments were generally carried out at night. Englishmen, therefore, took it for granted that the actual numbers of deaths were much larger than reported. At any rate they were excessive for so small a town, and, besides, large numbers of people had emigrated. In Husseinabad it was estimated that only about 2000 inhabitants were left. Nasretabad was practically evacuated, only 100 inhabitants, mostly soldiers and beggars, remaining. The town was without administration, all the shops and bazaars were closed, and the streets were empty and deserted.

Husseinabad presents a conglomeration of cupolas and walls, square houses and windmills, all grey and colourless, seldom relieved by a little verdure, some poor garden with mulberry and apple trees well sheltered by walls from the strong summer wind.

Nasretabad is of a quadrilateral form, somewhat longer from north to south than from east to west. It is surrounded by a mud wall and a moat filled with water.

Here also are a couple of gardens and palms. One feels depressed after a walk through this unfortunate, devastated town. To reach it you go westwards from the great gate of the Consulate, and pass a kind of square between the two towns. To the left are first some plague-smitten huts, and to the right the English bank within its own wall; beyond the whole southern side of the town wall of Nasretabad with round towers at the corners and in the sides. Farther off to the left is a long, low building, in much the same style as the Consulate, containing the shops of English subjects, and still farther off the warehouse of Russian subjects.

We enter by the south gate of Nasretabad, where some emaciated and pitiable beggars hold out their hands. Here begins the principal street which runs right through the town from gate to gate, and in which the bazaar shops are situated. The street is narrow, dusty, and dirty, a horrid ditch full of sweepings and offal, and the only people we meet are dingy soldiers and beggars who can hardly keep their rags on their bodies. The town is so small that it takes only a few minutes to cross. In the north-west corner is the *ark* or Governor's residence. Everything seems in decay, wearisome and miserable. I would not spend a single photographic plate on it. Even the residence was empty and desolate, for the Governor had left it, taking with him his whole staff of servants and ferrashes.

And yet this den at that time deserved a large measure of the world's attention. In political affairs Seistan is of great interest, owing to the secret rivalry or contest for influence between England and Russia. The country lies half-way between India and Teheran, and between Transcaspia and the Persian Gulf. Strained relations may at any time reach an acute stage, and the struggle for Iran may begin at Seistan.

More fearful, however, was the danger that the bubonic plague might extend from Seistan. After the report that Turbet-i-Haidari was infected, all seemed to be favourable for the spread of the pestilence westwards. If it reached Meshed with its 150,000 pilgrims in the year the disaster was certain. Then by the numerous routes

radiating out from this town the whole Mohammedan world in Western Asia would be attacked, and it would be hopeless to stem the course of the disease. How much better it would have been to stop infection at Seistan! Fortunately, the pestilence did not this time spread farther west, but it might easily have done so, and then the Persian authorities and, above all, the priesthood, would have been to blame for the incalculable misfortunes which would have resulted.

The plague is less mysterious than cholera in its behaviour in so far that its propagation can be explained. If it is introduced into a family and seizes its victims, it does not leave the house till all the inmates are dead. Cholera, on the other hand, may attack and kill one member of a family and spare the rest. Cholera is more insidious and uncertain. As regards the plague, it is known that an absolutely isolated house can be protected, while all that dwell in the immediate neighbourhood of the sick are practically doomed. The spread of the disease can only be combated by the most energetic measures. In an infected house, or rather mud cabin, fuel should be strewn on the earthen floor and lighted. The mud walls can only be rendered safe by a heat of several hundred degrees. All clothes and household goods should be thrown into the fire, and thus the infection may be stamped out. With fire the spread of infection in the northern Seiyat villages had been successfully checked.

Captain Kelly had visited many plague-stricken persons. He said that the patients suffered fearful tortures, became apathetic and indifferent, and desired only to be left to die in peace. The parts of the body where the buboes break out are especially painful. If the bubo bursts in time the patient may recover. But if the pus penetrates by an internal wound into the lymph glands and blood, death soon ensues. Pneumonic plague, that is the form of disease which attacks the lungs, is almost always fatal, because the microbes are there safe from the cells which destroy them. The doctor is more exposed to danger near such a patient than anywhere. All that is necessary to give him the disease is that the patient should cough and the smallest

particle of expectoration light in the doctor's eye, where the microbes can thrive in moisture. If he has the smallest scratch in the conjunctiva caused, for example, by a minute grain of sand, the microbes enter and do their work.

Rats contribute greatly to the spread of plague, and this was also true of rats in Nasretabad. They die of plague themselves, and their parasites spread infection. When a rat dies his parasites leave the carcase as soon as it is cold and watch for an opportunity of settling on some other creature near, perhaps a man. I heard from Captain Kelly that dogs are supposed to be immune, but their vermin, dog ticks, may transfer the infection to men, for the microbes live in these parasites. During my sojourn in Nasretabad my dogs were tied up outside the men's abode, but the dogs of the Consulate went out and in as they pleased, especially at meal-times.

Captain Kelly had arranged his laboratory in a fine large Indian officer's tent, set up on a common before the Consulate. A microscope stood on a table, and here I had an opportunity of making acquaintance with the horrible microbes which were exhibited in various preparations. They were dead and stained, and were wonderfully conspicuous. They were really not much to look at—a quantity of small insignificant black specks. And yet these specks are more dangerous to man than the most perfect destructive engines of the modern art of war, and more devastating than any campaign. I looked at them through the microscope with a certain respect. They were magnified twelve hundred times, and yet were exceedingly minute.

When I expressed a wish to see, not indeed the microbes themselves in their activity, but at least their sphere of work, a dying man, and to observe the symptoms when an unfortunate sinner succumbs in the unequal strife, Captain Kelly peremptorily refused, not so much because of the danger that threatened me from suspicious malevolence, but rather because of the direct danger of infection. I proposed to accompany the doctor when he next visited a patient in a far-advanced stage of the disease and wait till death supervened. But he would not consent, the risk was too great.

"But the risk is just as great for yourself," I returned.

"Yes, of course; but I am only doing my bounden duty in visiting the sick."

"I can accompany you as a temporary assistant."

"No; I will not take the responsibility for your life. When a man dies of plague his vermin emigrate, and those who happen to be near are very likely to catch them, and take the plague with them."

Large quantities of plague serum had been sent from Bombay for Captain Kelly's use. The microbes to be used for cultivations are taken from the bubo of a sick man, and the operation is very dangerous. The operator must be quite sure that he has not the least scratch on his hands, and be careful not to wound himself with the point of the small syringe with which the deadly fluid is extracted. On such an occasion one of Dr. Kelly's assistants had failed to notice a small prick in his finger. He died within thirteen hours.

The yellow serum is preserved in small annealed glass tubes, each containing 5 cubic centimetres, or enough for a single injection. The doctor must make sure that the tube is absolutely perfect and hermetically closed before he breaks off the end and fills the hypodermic syringe, after it has been cleaned and his hands washed in carbolic acid. In Bombay it once happened that there was an insignificant crack in a large glass tube, but sufficient to pollute the fluid. The seventeen persons who were inoculated with serum from this tube all died, an accident the more to be deplored because it naturally shook the people's faith in the doctors.

At first the people in Seistan could not be persuaded to allow themselves to be inoculated, and the priests actually forbade believers to submit themselves to such an experiment. But when the plague spread, and fear and anxiety drove the unfortunates to try any remedy at hand, they came, bared their left arms, let the assistant wash them with carbolic acid, and the doctor run the small fine needle of the syringe under the skin. Most of them did not believe that this extraordinary process could save them the plague, but they saw at any rate that they suffered no

harm from it. Two occurrences fortunately helped the doctor. In one house the man only had allowed himself to be inoculated, but his wife and daughter would not submit to the operation. Both died, while the man escaped. A great impression was made on the people of Nasretabad when the plague visited the home of the Consulate's gardener, killing four members of the family, but sparing the man himself, who had previously been inoculated. Then they perceived that this treatment was the only preventive they could find. The remedy is not, indeed, absolutely certain, but it reduces the cases of mortality by 75 per cent, and that is a splendid result. Ninety-five per cent of the sick natives died.

Immediately on my arrival in Nasretabad I was advised to submit myself to inoculation like the other European residents. The operation took place in a small room in the hospital. A large lump rose on the arm after the 5 cubic centimetres of serum had been forced in under the skin, and a slight burning feeling was experienced. It soon subsided, but returned again after two hours. The arm became stiff and difficult to bend, and in the night I had a touch of fever, but nothing to cause discomfort. Next morning I felt nothing at all.

Captain Kelly kept an exact record of all the inoculated. My number was considerably over 400. Of all those who had been inoculated up to that time not one had died. The natives themselves began to take note whether a man who died had been inoculated, and could draw their own conclusions. But still their distrust had not been overcome, and 400 was a trifling percentage of the whole population.

In Husseinabad the natives resorted to the following barbarous remedy handed down from the Middle Ages. The aching boil is covered with a piece of felt. Over this salt and water are poured and a hot iron is pressed on it, and the heat penetrates through the boil down to the muscles. It is certainly a severe remedy against microbe colonies, and the bacilli which come in contact with the iron must surely suffer. Some men who were treated in this manner are said to have actually recovered.

When the epidemic began its work of destruction in Nasretabad the mushtehids and mollahs thought that they could drive away and exorcise the plague demon by marching daily round the town wall with a sacrificial goat at the head of the procession. They carried the Koran and read prayers from it; they had music and black flags, or rather a square piece of cloth stretched between two poles, and when the circuit was completed the goat was offered up to Ali. These processions became very popular, and the people believed in their effectiveness. They embodied, so to speak, in the eyes of the credulous the divine powers, and the priests in their white turbans and long kaftans appeared imposing as mediators and intercessors with God. In reality they helped to a large extent to spread the epidemic. How many who walked in these processions came straight from plague-stricken houses and gave the infection to those who walked beside them? Exorcising processions, under the protection of Allah, were nothing but dances of death—a march to the grave.

Afterwards, the processions ceased, not because they were useless, but simply from lack of people and goats. People died instead, and the custom died out; people fled from the infected town, and at length there was no one left who cared or had the means to pay for the goats.

Those who were left resorted to another expedient. The chief mushtehid of the place, Mollah Mahdi, collected the people to *rosa-khaneh*, or prayer-meetings, in the square before the mosque which bears his name, Meshid Mollah Mahdi. There tea and kalians were passed round among the guests, and the blinded and obstinate men found another means of spreading the plague by means of gatherings.

The Englishmen tried in vain to bring this Mollah Mahdi and the other priests in Nasretabad to reason. With their assistance it would have been easy to extirpate the plague in a month; but nothing could be done with them, for their chief aim was not to lose their hold and influence over the people. As far as possible deaths were kept secret from Englishmen, and most of the burials took place at night. When Macpherson and I were out one day for a walk we met some men bearing a coffin, and

another time saw men washing a corpse in a pool of stagnant water. Horrible scenes occurred when the poor could not afford burial, and threw the corpses into the street.

The small town possessed only two coffins, and in these simple boxes all the dead made their last journey to the burial-grounds. The coffins were not buried, but served only as biers. At the grave the body was lowered into the ground and placed in a niche or excavation, so that the earth might not weigh on it. The coffins were carried by men, and were naturally another medium for spreading infection. These coffins were in constant use, and often went to and fro several times in a night. Interments were more and more carelessly performed, and we heard of two cases in which natives digged their own graves that they might have them ready in time, and might be sure of decent burial, and not be exposed to birds of prey and jackals. There was a certain affecting resignation in this. On April 15, it was reported that at two houses, where deaths had occurred, the inmates had cleared out with all their belongings, locking the doors and leaving the corpses to corruption. It was anticipated that poor wretches would break into these houses and settle in them. We had heard, as far back as April 10, of cases where people did not take the trouble to carry bodies to the usual burial-grounds, but buried them anywhere, in courtyards and fields. On April 11, it was reported that a poor wretch had dragged a body along in the dust of the street and thrown it down before some shops, that their owners might see after its interment.

The fresh, cool weather still prevailing was considered very favourable to plague. It has been noticed in India that plague declines and almost ceases in midsummer. It was, therefore, hoped that the great heat would put an end to the epidemic in Seistan. The reason seems to be in a great measure that in cool weather the people remain indoors and crowd together in small stuffy dens. When it is warm the people are more scattered, and the infection is prevented from passing from one to another.

255. The English Consulate in Nasretabad.

256. On the Road from Nasretabad.

CHAPTER LVI

THE HILMEND

In the evenings we met together comfortably in the house, while the plague raged outside among these unfortunate people, who would not be guided and advised by Europeans. In the morning we walked on the roof of the Consulate, where there was a wide view over the awfully monotonous and wearisome and yet singular country. The air was hazy, and Kuh-i-Khoja was only just visible. Besides the small, sickly gardens in the town, a strip of green was seen only to the east. All the rest was grey clay, more or less scored by wind erosion. The cultivated land lies farther south, in a network of irrigation canals from the Hilmend.

The previous year, that is, 1905, the Hilmend was very low in September, and its beds could be crossed anywhere. The large, broad, main channel was now, in April, said to be 150 yards broad at Bend-i-Seistan, and was dry for the most part, only a small, winding thread of water remaining. The rest of the bed was filled with driftsand, 2 feet deep. It was, indeed, quite impossible for me to travel across the Hilmend and through southern Afghanistan, for neither the Indian nor the Afghan Government would have permitted it under any conditions. Not even an Englishman can obtain permission; the Emir is inflexible. Nor has the Persian Government allowed Englishmen to lay a telegraph between Nasretabad and Robat, the extreme point of the Indian telegraph line in Baluchistan. The English Consulate is not, therefore, in direct telegraphic communication with Nushki; between Robat and Nasretabad

telegrams are forwarded on horseback. A direct road through south-western Afghanistan would shorten the distance to Nushki by more than one-third.

A characteristic feature of the Seistan climate is the *bad-i-sad-u-bist-rus* or the wind of 120 days. It usually commences in the middle of May and lasts all the summer. It is, however, difficult to determine exactly when it commences. The last northerly gale was looked upon as its forerunner. After one or two weeks another storm of one or two days might be expected, followed by ten calm, hot days. Then another more violent storm followed by seven days of calm. Then a third storm with only two days of calm, and at last, when the constant wind had set in, it would blow continuously for two weeks, with an interval of one day's calm when at its height. Then it comes in gusts again before it becomes constant and lasts through four months.

The wind is burning hot and dry, and comes from the north-north-west. The Consulate is therefore built from east to west, and is exposed to the wind, which can pass right through when all the doors and windows are open. But this wind is extremely enervating and depressing, and Captain Macpherson, who had been here two years, thought he could hardly endure a third. But the blast is cooled by setting gratings of wood in the windows, in which leaves and camel-grass are twined and constantly watered. Thus a little coolness is produced in the shady rooms. Once a velocity of 150 feet a second had been recorded by the anemometer, and there is a complete hurricane even when the force of the wind is considerably less than this.

Captain Macpherson and his men had tried in vain to plant trees round the Consulate, in order to modify the heat and light, but the soil is impregnated with salt, and the strong wind prevents their growth. Some small, stunted trees, not sheltered by walls, had grown up at an angle of about 20° from the ground to leeward. Only grass lawns surround the house of the Consulate.

Of course the wind models the alluvial soil when it is dry. But in the Hilmend delta the furrows never sink very deep before fresh floods come. In the Lop-nor basin

ages of exposure intervene between the different floods; there we have two basins, here only one. The previous year the Hamun basin had been practically dry. Water, however, always remained in its deepest hollows, becoming brackish. In the winter 1905-6 three oscillations had been noticed in the Hilmend, in the middle of December, at the end of January, and in the middle of March. The last was still in progress, and would attain its maximum in two months, and the river would be at its lowest in August. Then from October another rise begins. It depends on the melting of snow and on rain in the mountains, while the former two are due only to rain.

The delta of the Hilmend is converted at the time of high water into a single lake, huge sheets of water covering the beds and hollows. Large quantities of silt are carried down yearly, and level the surface. When the water has vanished, the wind begins its work of excavation. The lower Hilmend has moved to the west during the last thirty years, as may be seen from Goldsmid's maps. From Bend-i-Seistan the water spreads out in delta arms, one of which runs north-westwards, and they were its ramifications that we crossed on April 9.

Seistan has long been a bone of contention between Persia and Afghanistan, chiefly on account of the valuable irrigation water and its apportionment between the two States, a dispute not easy to decide during seasons when the river is small. The work of the English Commission under General Sir Frederic Goldsmid, which in 1872 had the task of arranging matters, was of little use when the river changed its bed twenty-four years later. A war had almost broken out when England, by virtue of the Treaty of Paris of 1837, was chosen as arbitrator between the two States. The leader and head of the large and thoroughly well-organized Commission was Colonel Sir Henry M'Mahon. Its thorough and exhaustive work occupied two and a half years, being concluded in 1905. The Commission divided the water-supply between the two contracting parties in a manner which ought to have satisfied both. Nevertheless the Persians grumbled, and expressed their dissatisfaction.

All the time the Commission remained in Seistan the most exact work was executed in various branches; extremely accurate detailed maps, precise determinations of gravity, geodetic, astronomical, and meteorological observations and hydrographic measurements, in particular of the volume of water and the water-level in the Hilmend and Hamun. This extremely valuable and multifarious material is, it seems, buried in the meantime in the archives at Calcutta, and will not be published as long as the political result of the Commission retains its validity.

On April 12 I bade farewell to my six servants. They received their pay and the expenses of their journey home, and set out with 500 tuman in their pockets. On the part of the Consulate especial arrangements had been made for their comfort on the journey back to Bendan, and then the country lay open before them all the way to the holy Meshed, and there they would find no difficulties—every Persian is a born traveller. They packed their clothes in double sacks and bags, secured their money in their belts, kept the black dog at their own request for a night watch, and after a last *Bismillah*, in the name of God, and hearty thanks for their good behaviour and good wishes from me, they set out to the land of their desire, the land of the sun, Khorasan.

My days of rest also flew past, and the last soon came. A memorable time it had been, for I had had the comfort of home and was free from all worries, and the absence of amiable ladies troubled me no more than when I was at the Pamirski Post. We talked of the political outlook in this part of the world, listened to the doctor's dissertations on the plague, and wondered at the Hilmend water, which was still rising, and had come up near to the foot of the courtyard wall; one fine day it would flood all the low-lying court, and make an island of the house.

I had obtained confirmation of the English Government's permission to travel through Baluchistan, a privilege which Sir Rennel Rodd kindly obtained for me from Lord Lansdowne.

Captain Macpherson had looked after baggage and riding animals to Robat on the frontier, and the cook of

257. The Hilmend.

258. Two of my Servants taking Water from the Hilmend.

the Consulate provided me with a very acceptable supply of provisions.

Early on the morning of April 18 the caravan of seven dromedaries set out, and after a last breakfast with the genial and hospitable Englishmen, I took a hearty farewell of them, mounted a tall dromedary, and left Nasretabad, attended by four *sevaris* or mounted men, and four men who took turns in carrying the Berton boat. My body-servant on the road to Quetta was to be the young Riza, a Persian of Nasretabad, who had fortunately escaped the plague. He was a youth of twenty years, poor, ragged, and unhappy after losing all his relations by the plague, but he had a pleasant look, was lighter than most Persians, and was very glad to go with me. He had never in his life been outside the boundaries of Seistan, not even to Bendan or Robat, and he thought we had a long way before us. He had only come in contact with Europeans when he had been turned out of the Russian Consulate ten days before, because he had quarrelled with another servant.

"Can I take him with me?" I asked Captain Kelly, who submitted him to a thorough examination.

"Yes, certainly; he is quite sound now, but he may develop plague on the way. However, the risk is very slight if he is well washed immediately before starting, and dressed in new clothes from top to toe, and is forbidden to enter the town again."

Riza submitted himself to this process without a word. Two servants of the Consulate took him in hand, stripped him, and burned in the fire every thread he had on his body, to remove the temptation of saving any infected article, dipped him again and again in water, douched him with tubsful, rubbed him like a dog, and scrubbed his head with soap and a brush. Then they dressed him in clean white undergarments, a pair of elegant trousers, and an old black jacket, a pair of yellow shoes, and a white felt cap. When he was ready, and carried my field-glass and small camera by straps over his shoulders, he looked much finer than his master; he looked like a "mossoo," and I like the garçon. In his demeanour there was a mixture of

assurance and of a sheep led to the slaughter. But he was always willing and attentive and behaved like a good fellow.

Immediately outside the eastern gate of the Consulate's courtyard we come out into the desert, where no furrows are formed because of the continual changes of the delta and the sediment which levels every part. The soil is impregnated with salt, which can be felt on the lips in the wind, the little steppe vegetation there is, is meagre and dried up, the horizon is as level as a sea, and only in the distance is sometimes seen the outline of a village. Such is Bunjar to the left, of ill repute, for it was from there that the attack on the Consulate originated; men from Bunjar came into Husseinabad, and with this reinforcement the people advanced to the assault. Now the plague had visited the village, and it was quiet. Otherwise the country in front of us to the east was untouched by plague.

On the path we meet two men with asses, laden with tamarisks and other steppe plants, but no other living thing. Large sheets of water cover the flat land, and send out ramifications in every direction. We cross a belt of sandhills and two canals with wretched bridges of twigs and branches dipping in the water. One of them runs to Husseinabad and the villages to the south of it. The weather is fine, not warmer than 72.7°, and the fresh breeze keeps mosquitos and gadflies at a distance.

We ride among the wheatfields of Yalais, like green lakes among the everlasting grey, lumpy, and uneven ground. A few willows and fruit trees rise above the horizon, and we seem to be a long time in coming up to them. Here all seems calm and peaceful, and children play outside the huts.

Flooded areas, fields, which always lie in hollows, small belts of dunes a foot or two high, desolate tracts, flourishing copses of tamarisk, here and there black tents with flocks of sheep around them—such is the country we cross until we come again to a group of scattered villages. One of them, Khamak, is half buried in sand, a curious mixture of small wretched mud cabins and sandhills. Dunes rise up between the houses in the centre of the village, and houses stand up out of the dunes. Some of the cabins are actually

filled with sand, and have partially fallen in. The surrounding fields are studded with light-yellow dunes contrasting strongly with the fresh verdure. The dunes are crescent- and shield-shaped as far as they have not been altered by fences of twigs thrust into their crests to prevent them moving. Only to leewards, south or south-east, there is no sand.

Two more villages, and then we ride through large wheatfields smelling pleasantly of the wheat which will be ripe for harvest in twenty days. And then, again, comes a belt of sand on level clay ground, and with tamarisks which blossom amid the dunes.

Through an intricate maze of dunes and tamarisks, flooded ground and reed huts, we come to an arm of the Hilmend, the Rud-i-Seistan, and follow its right bank for a while. The current is swift, and the thick muddy water breaks into abrupt waves in face of the wind. The water-level is very high, being almost up to the edge of the high-water terraces, and the large river is cool, the temperature being 61°. On the left bank is the village Burch-i-ser-i-bend, "the fort at the beginning of the embankment," and on the right bank nomads wander with their flocks. They are some Parsis, others Baluchis, and live either in huts of reeds or in grey beehives of mud daubed over a framework of tamarisk stems.

The Berton boat, which was only needed here, was made ready, and the baggage was taken over in several trips. It was more difficult to get the dromedaries over the river. A man put under one arm a bundle of ordinary well-corked gourd-shells, and supported by them swam over the river, holding the nose-rope in his other hand. Another man clung fast behind the hump to prevent the animal coming down on his nose in the water. With this ballast the animal is kept in equilibrium, and can hold his head above the surface. Some obstinate animals had to be towed over with the help of the boat. Our four riders rode on the horses through the river without trouble.

We set up our tents on the bank in a furious wind, which howled and moaned mournfully outside while the large volume of water rushed by, a striking contrast to the

dry country before us. At length Riza came and served up his first supper.

A northerly storm raged all night with whirling and swirling driftsand, which penetrated everywhere and formed a heap 4 inches high in my tent. All odds and ends, all sweepings and refuse that had lain about in the evening, were covered with sand, and the ground looked neat and tidy. And when we again mounted our dromedaries, and the storm continued with the same impetuosity, we were pestered by blown sand, and closed our eyes and mouths as tightly as we could.

Between a large lagoon and the river we pass along a narrow spit, and then leave the Rud-i-Seistan and ride among dunes and tamarisks. Then we cross some mounds and ridges of clay and ascend to a plateau with its surface bestrewn with gravel. In the distance scattered villages and ruins are seen, and to the north the green belt of vegetation along the river, bounded on the farther side by a plateau similar to our own. This rise in the ground, which lies some 30 feet above the bed of the river, marks the eastern edge of the Hamun basin, and floods cannot extend beyond it.

After we have crossed two roads from deserted villages in the slightly undulating country, we come to the place where the last Commission had its camp, like an abandoned town where only bare mud walls are left, and silence and desolation reign. The mud houses seem to have been erected in separate quarters for the various members of the Commission. Most of them had sloping roofs to carry off the rain-water. A large space was taken up with clay mangers, where the horses stood to eat their corn. Several skeletons of dromedaries lay where the Afghan caravan men had their camp. The climate of Seistan was fatal to many of their animals. A more dreary and dismal site for a camp can hardly be imagined, but there was good reason for its selection. Only up here were they safe from floods, gadflies, and mosquitos. The place is now called *ordu* or the camp.

We go down to a steppe with tamarisks and grass, and on the left the little fort of Kohak crowns a solitary mound.

259. One of the Dromedaries being Towed over Rud-i-Seistan.

260. A Boundary Pyramid and a Baluchi.

Gulmir, commander of my escort of six *sevaris*, informs me that it is *mal-i-Kajar*, that is, the Shah's property. A Baluchi tent stands beside it, and a number of cows are grazing around. Beyond the fort, to the east, is seen the Hilmend, as large and fine as a lake.

We ride down to the left bank of the great river, and there make a short halt. On the bank terrace Gulmir points out the highest water-level which occurred during the stay of the Commission, and it lies $17\frac{3}{4}$ inches above the present level. This year the river has been $4\frac{3}{4}$ inches higher than now, as can be seen by the still moist mark. Three years ago large areas of the bank zone were flooded, where only a little pool stands now.

The river gave me the impression of being considerably larger than the Aksu-darya in autumn. Regular foam-crested waves covered its surface, and to the north it looked like a large bay, an illusion chiefly due to the hazy weather. Rud-i-Seistan is a small part of it, and yet is itself a large river. It leaves the Hilmend at a sharp angle, and between the two a sharp point juts out into the grey stream.

When the water is at its lowest 1000 workmen are collected from all parts of Seistan to rebuild the dam called Bend-i-Seistan, which, starting from the right bank of the Hilmend, crosses its bed to the point mentioned and turns the water into the Rud-i-Seistan. The dam is made of boughs and tamarisks twisted together into a stout fence. It is a necessary condition of existence to Seistan, for thereby the villages of the country are irrigated. It is annually swept away by high water, and now only two small fragments remained standing up in the middle of the Hilmend. But by the time the dam is carried away by the pressure of the water it has already done its work.

CHAPTER LVII

ON THE FRONTIER BETWEEN PERSIA AND AFGHANISTAN

A LITTLE above the point where we leave the bank of the Hilmend (1700 feet) the firm terraces of clay and pebbles reach the river and have an elevation of about 16 feet. Farther inland they become higher. Here stands the first boundary pillar, or rather the last, for they are numbered from south to north. I had promised Captain Macpherson to write him a report on the boundary pillars, for they had not been inspected since they were erected by the Commission. We therefore rode south-south-west from pillar to pillar, with Afghanistan on our left and Persia on our right.

As a rule from one pillar the nearest two can be seen. They are erected on small mounds with ravines and hollows between them. Sometimes the top of the plateau is quite level, sometimes we wander in a labyrinth of clay mounds, cones, and furrows. We pass nine columns before we encamp in a small hollow, where a party of Baluchi nomads have set up their black tents, and their sheep graze on a small sheltered meadow (1722 feet). Here we can get milk, and water we have brought from the Hilmend in four skins. Thanks to the wind, it is pleasantly cool, and we are not at all troubled by insects.

April 20. 47.5° in the night. The path, almost imperceptible, leads us up and down over hills and through ravines, where a scanty growth occasionally finds shelter. Here and there we cross roads; the last yesterday was said to come from Kala-i-no, or the "new fort," and the first to-day runs to Deke-dela, a village on the Hilmend, where there is a *bender* or harbour with *keshti* or boats. My

escort, black-bearded Baluchis, are very obliging and attentive, and communicate unbidden what they know about the roads and country. Round the frontier pillar numbered 40 one of them drew a ring with his ramrod, and when I asked what it meant, he answered that two of our men had stopped at the last village to buy wheaten flour, and the ring in the ground was to show them the way we had taken, which was determined by opportunities of obtaining water.

These Baluchis look well and picturesque in their loose, becoming, national costume; light underclothes, wide trousers, often rolled up so that the legs are bare, no stockings, white coat with wide sleeves, a bulky girdle, and a cap on the head, round which a white turban is wound. They are, then, all white from top to toe. And now that it is decidedly cold rather than warm they wear large white felt cloaks, often hanging down to the feet. Their rifles they carry easily and gracefully by belts over the shoulder, and they are always supple, light, and easy in their movements.

Terribly monotonous is this landscape! An endless succession of ravines across the terrace plateau. The only relief is afforded by the frontier pillars, so the monotony may be imagined. They are about 10 feet high, truncated pyramids of white-plastered brick; but now the plaster has fallen off most of them, and forms a white ring round the base. When it remains the column is visible from a long distance; otherwise it is swallowed up in the grey tone of the landscape. In other respects the columns are in very good condition.

At Nos. 35 and 34 we pass the Rud-i-Kadin, an old bed of the Hilmend, with a high and large terrace on the right bank and a very small one on the left. Between Nos. 33 and 32 we turn at right angles from the *rah-i-mil* or "road of the marks," and pass through a singular winding, narrow, and fantastic ravine of clay between rounded domes, cones, and pyramids—perfect houses, towers, and walls, between which still narrower ravines run in from the sides, all dry and barren. Among this chaos of domes, cupolas, and blocks some frequently rise above the rest, 50 to 65 feet,

just as in the Lop desert. Sometimes we might be passing through one of the characteristic Persian villages, all mud cupolas and walls, but there are no palms or screaming children here. We soon notice that these clay elevations stand in a line running N. 25° W. to S. 25° E. They are, then, formed by deflation. The wind, which comes from NNW., ploughs up the ground, the harder parts remaining in the midst of the channels. As we are going south-west we have to cross them all. It is, however, much easier here than in the Lop desert, for the elevations are often interrupted. We also notice in two escarpments that the clay is horizontally bedded. This is a relic of the deposition of alluvium by the Hamun in former times. Often the bedding is concealed, and the blocks of clay have been deformed by rain, grooved vertically by the rain-water's small furrows and channels. At the bottom of the hollows the ground is often level and hard as asphalt, for here the rain has deposited the washed-down silt. It is a horrible country, a confusion of misleading paths, and it is hard to understand how the leader finds his way. No doubt he has his old well-known marks.

On the largest mass of clay, some 65 feet high, stands the column marked with the number 27, and when soon after we have emerged from the worst entanglement on to a small level space with a little vegetation, we pitch our camp, No. 70, at a height of 1706 feet. It was warm and close in the narrow corridors after the wind fell, and house-flies, biting flies, mosquitos, moths, and spiders came out again.

Early next morning two of our riders scampered on in front on their jambas or running dromedaries to see if there were water in a tank on the road. If not, we should be obliged to turn westwards, as we had now only one skin of water left. What a contrast: here this dry desert and not far off the Hilmend's inexhaustible wealth of water! It is just the same in the Lop, where one is in the midst of the driest desert only a day's journey from lakes and rivers. Here, however, it is better than in the Lop desert, where a drop of water can nowhere be found.

We go on and pass mark No. 26. Near it the blocks

261. Horizontally Bedded Clay.

262. The Gumbez near the Shela.

carved out by the wind are 30 feet broad at the base, 16 feet at the top, and 16 feet high ; the intervals are 30 to 50 feet broad. They diminish as we proceed, standing on the right like an archipelago of small yellow reefs, while on the left is gravelly desert. The latter is called by my men *desht-i-siah*, or black desert, while the clay desert is called *desht-i-sefid* or white desert. The ground becomes easier, and the slightly undulating surface is bestrewn with pebbles a third of an inch in diameter.

Cha-i-ladad, where our scouts were waiting—a sure sign that there was water—was a favoured spot, quite a paradise in this dismal desert. Two round pits, 13 feet in diameter, had been digged in a copse of luxuriant tamarisk, and they still contained plenty of perfectly sweet rain-water. The dromedaries stood at a natural pool near by and enjoyed a good drink, while we filled our water-skins. A thriving tamarisk hung over one of the pits. This fine oasis lay at the beginning of our day's march, and we were loath to leave it.

All day the road runs about 100 yards to the left of the boundary pillars, and therefore in Afghan territory. All these pillars are built of sun-dried bricks, and therefore cannot last a long time, but possibly the frontier may take another course before they are destroyed by wind and rain.

Then we cross the old river bed which runs from Bender-i-Kamal-Khan to the villages Kunder, Machi, Bagerdi, Navar, and Khormeh, a locality now desolate and in ruins. This bed, which is insignificant and much levelled down where we see it, is followed by another more clearly marked out, and in its bottom lies a heap of tamarisks and rubbish ; it runs from east to west. Then follows a bed still larger and more conspicuous than the preceding. It has abundance of tamarisks, and near the bank stands a *gumbez*, or tower of mud, in a good state of preservation.

With 78° in the shade at one o'clock it is burning hot riding towards the sun, the air is nearly quite still, and flies and mosquitos are about again. Nevengk is inconvenienced by his warm coat, and runs panting in the shadow of my dromedary. The sky, however, is mostly overcast, and in

the south, where thunder rumbles, a storm is gathering. The height is 1808 feet.

South and south-west a bright light-yellow outline comes in sight; it is the *rigistan* or sandy desert. It lies exposed to sunshine while we are in shadow, and beyond Kuh-i-Malek Siah there is a gleam as of a small sunset. Some drops of rain fall, coming from the south, where a stump of rainbow is visible, and to the right of our route rain must be pelting down. At five o'clock comes the expected storm rushing up from the south-west with light clouds and streaks of sand and soil sweeping over the ground. A pleasant coolness is felt. The air grows thicker, and the view of the distant hills to the west and over the adjacent desert to the south disappears, and then comes a heavy shower which only lasts a few seconds and makes the stones on the ground shine for a while.

At the frontier pillar No. 14, which is much damaged by wind, we turn westwards to avoid a belt of sand. To the north-west we can hear the hissing sound of pattering rain, and before us we see a shining surface which is said to be freshly fallen rain-water. We steer our course in that direction and encamp on the shore of a very small lake, which has a few minutes before come pouring down from heaven (1745 feet). Irregular and shallow, it was more like a swamp in a shallow hollow among the tamarisks, but the place was attractive, and the rain-sprinkled needles emitted a pleasant odour from the luxuriant jungle. After the refreshing douche the air was brisk and cool, and a curious steam rose from the water, forming a veil over the ground, through which the tamarisks looked like spectres. Thunder growled for three hours more, but the storm withdrew to the north.

Late in the evening the Baluchis sit around great flaming fires looking like Beduins with their white costumes and copper faces. The dromedaries form dark shapes against the firelight, and the tamarisk copses are brightly lighted by the flames. A striking and fantastic scene!

A strange night before April 22. I had scarcely fallen asleep before a roaring, rushing noise was heard in the south as of a tumultuous waterfall, and two minutes later came

263. Through Wind Furrows in the Clay Desert.

264. Among Clay Ridges.

a storm, plucking up the tent-pegs and making the canvas flap about like a torn sail. At two o'clock I was awakened again by a downpour of rain pelting on the tent, while a fine drizzle of minute drops came down through it. The temperature fell to 48.7°, and the air was cool in the morning, and so clear that the distant hills to the south showed up in brown and red tints.

We travel west-north-west between regular shield-shaped dunes at most 10 feet high. The ridges between the fine groovings dry quickly, and become light in colour, while the hollows between are still wet and dark, so that the dunes are striped like a tiger skin. But the sandhills become higher the farther we advance, and from the highest, which rise 13 to 16 feet above the ground, our riders take a look round to get the bearings of the land-marks, for here there is no sign of a path. The base on which the dunes are raised consists of hard yellow clay, in one place bestrewn with quantities of blue and red fragments of pottery, and here also are left roots of one or two ancient palms. Saxaul and tamarisk occur in quantities, and also other steppe plants. The saxauls are as much as 13 feet high and are like shady trees.

To the left of our route stretches high continuous sand, and we cross an offshoot from it, where the dunes are as much as 26 feet high. The dromedaries roll like a ship in a high sea, and we turn more to the north-west to reach a smoother fair-way. It is again calm and sultry, flies buzz, steam rises up quickly after the rain, and it smells like a hothouse, for now the steppe vegetation is dense again, and the tamarisks show a beautiful green. Nevengk is tormented by heat and burrows in the sand in the shade of tamarisks.

Kachul is the name of a hard bare hill of clay, with a flat top plentifully bestrewn with fragments of pottery, relics of long bygone ages. The tamarisks also have seen better days in this wilderness, now taken possession of by driftsand. Quantities of dead tamarisks lie in the dune valleys like fallen heroes.

After passing round the deep sand, which is called Gerden-rig, we turn again southwards. The ground

becomes free of sand, and the saxauls come to an end, but the tamarisks grow the more freely on cones raised by their own roots. Of sand only here and there a yellow crest is seen above the darker line of vegetation. Farther on the tamarisks attain to a height of 16 feet, are dark and spreading, and the more conspicuous from the yellow ground on which they grow.

The weather is good; it certainly feels warm with a temperature of 79.9° at one o'clock, but there is a breeze from the north-west, and I sit with both legs over to starboard and thus have the sun on my back. We long for night, water, and cool air. The hours pass so slowly when the landscape is monotonous and the day is hot, and we travel nine or ten hours a day. Light as soap-bubbles, and with wings glittering like small rainbows in the sun, the ephemeral insects float noiselessly against the light breeze.

We pass on the left three gumbez or monuments of clay called Gabristan-i-Shela, and the bed of the Shela river is very near on the south. Shortly after we come to the road between Nasretabad and Kuh-i-Malek Siah, nothing but an insignificant track, for it is washed out annually by the rain on the immense alluvial flat that now stretches before us, where vegetation is almost absent.

A little later we are at the old bed of the Shela (1640 feet), which runs out of the southern extremity of the Hamun and proceeds in a south-westerly direction to the great salt swamp, God-i-Zirre, in south-western Afghanistan. We follow its left bank for a while. The bed is here 200 to 230 feet broad, and its bottom lies 20 to 23 feet below the level of the country. The upper part of the strand terrace is perpendicular and the lower part is steep. Water stands nearly everywhere in the deepest part of the channel, in white salt pools or in crescent-shaped, bluish-green sheets at the bends. Where we cross the bed there is a promontory, with a small channel cut through the middle. Here the bottom is treacherous, and to make it passable a footpath of tamarisk branches and twigs has been laid down. On either side of the point almost the whole bed is filled with large sheets of stagnant

265. The Point in the Bed of the Shela.

266. Salt Water in the Bed of the Shela.

water, concentrated salt, beautiful, crystal clear, and with the colour of the finest emerald.

This water does not come from the Hamun, but from the hills in the south, which send their water through two channels 10 feet deep to the Shela, where it remains and becomes salt from contact with the salt-saturated bed. If the drainage after heavy rain is abundant, the water flows on through the Shela to the God-i-Zirre and the Mulk-i-Afghan, or the kingdom of the Afghans, as my Baluchis called it. They declared that no water had come hither from the Hamun during the last ten years.

On the right bank the path runs for a while on the lower slope of the terrace, and on the left we have a large expanse of water which extends, as far as we can see, towards S. 25° E. Here Nevengk took the opportunity of having a bath and splashed about in the salt water, remaining in the bed of the river till we mounted up to the terrace. Farther on it was perpendicular, and the dog whined piteously when he could not get up. At last he found a way, and he looked very curious when the water had evaporated and the hard tenacious salt was left on his coat.

Now we cross a strip of desert as dreary and level as the Kevir. It passes by degrees into sand with dunes 6 feet high and their usual accompaniment, saxauls, which here approach a height of 16 feet. The air is hazy. A mist of vapour seems to hang over the ground, and it is warm and sultry. Here we meet a man mounted on a jambas who is carrying the English mail to Nasretabad. A man runs in front of the dromedary—he must have good lungs if he can keep pace with a jambas.

It is evident that we are on a frequented road, for we soon meet also a small Persian caravan carrying grain on asses, and farther on some men and women from Lutek, who have been in the Sarhad or hilly country. They have sheep with them and we buy one for 2 tuman.

After the sun had sunk into the mist in the west its fierceness was allayed, and in the evening we crossed quite a pleasant country with plenty of fine saxauls among small artistically formed dunes. It was late when we encamped

on a small gravelly terrace surrounded by quite a small wood of saxaul (1906 feet).

The time was short for pitching our camp. We had scarcely got everything in order before darkness fell. The men were in a great hurry in the evening to kill, cut up, and divide the purchased sheep and take a good meal. When at length they had thoroughly satisfied their appetite, and Nevengk, too, had had his portion, they slept soundly and snored around me. A Baluchi, it should be explained, sleeps on each of the four sides of my tent outside, to protect me from thieves and robbers, according to them. We are on a great highroad which, it seems, is not always safe. On the march they carry their guns loaded, and seem not to like to part from them; while some are also armed with scymetars and have a very martial appearance. They talk together so fast, and in such a lingo, that one can hardly perceive that it is a Persian dialect, but they understand very well my scanty but carefully pronounced high Persian.

The youth Riza amuses me vastly. He behaves irreproachably, and looks both stupid and roguish when he brings in my supper, as if he thought, "The master must be modest if he can put up with this." He can cook a fowl till it becomes rather soft, and eggs till they are hard as stone. I can scarcely restrain myself from laughing when I see Riza in his remarkable costume; and he does not look more elegant since he has begun to put on his clothes in the wrong way; first the trousers, then the long white shirt coming down to his knees, and above it the jacket, which is much shorter. He is quite convinced that those who do not wear their shirts over their trousers are wrong.

I wonder what Riza thinks of during the ten long hours he sits swaying on his dromedary. Something or other he thinks of, for when he serves my supper in the evening his eyes look as if he had been weeping. Perhaps he is mourning for the relations and friends he has lost in the plague. Later in the evening, when all the Baluchis are already asleep, he lies by the camp fire and sings a lively air. Joy and sorrow alternate in the mind of a Persian as

267. Sterile Gravelly Desert.

268. Siaret-i-Malek-i-Siah.

easily and quickly as the spring weather in this poor expiring country.

He wakes me at five o'clock, and I am glad to come away from the cloud of gnats which have tortured me during the night. The minimum temperature has been as low as 49.1°, and the clear sky and calm air foretell a warm day. We are, moreover, on the way to the south, and every day takes us a step nearer to the summer, which converts these lands into a burning furnace. Before half-past six the sun watches us commence our last day's march in Persian territory.

Thanks to the clear atmosphere, we can see the southern hills much better than yesterday. They are visible in all their details in shades of brown and red. It is quite a low range, with a summit in the south-south-west overtopping the rest. This is called Kuh-i-Malek Siah or Malek Siah-Kuh, the black king's hill, and at this boundary column three kingdoms meet,—Persia, Afghanistan, and Baluchistan. This hill, then, plays here in the south-east the same part that Ararat does in the north-west, where Persia touches Russia and Turkey.

Far to the north-west is faintly seen the row of hills which bound the Seistan basin in this direction, and among them the Pelenk-kuh or Pelengan-kuh, the "panther hill." Only to the south-east does the country seem to be as flat as a pancake.

Now at length the country rises towards the south-west. The vegetation thins out again, the gravel increases, we come to this red disintegrated hill and enter winding dells between low gentle mounds. Hormak is a small hamlet of two huts, where not even a cat is to be seen; but a sweet spring bubbles up, and we are glad to rest a while and refresh ourselves at its rivulet. Here, too, grow melons, the large watery fruit which is such a boon and blessing in a desert land. In the solid rock is a reddish-brown sandstone tufa, with volcanic ash and a dark compact felspathic basalt.

Two more narrow dells and small thresholds and we are at the *gumreh-khaneh*, or customs station, which bears the name of Kuh-i-Malek Siah (3140 feet). When we

approached this dreary place two Persians came towards us and prepared us for five days' quarantine, as we came from a plague-stricken country. But the customs officer, who, save the mark, is a shahsadeh, or prince, and is named Muhamed Ali Mirza, had received orders from the Belgian gentlemen in Nasretabad and declared that the way was open to us.

The other officials in the place were an Indian doctor, the superintendent of the telegraph station, and the English Vice-Consul, Muhamed Ashref Khan, an Afghan, who spoke English fluently, and gave me the impression of being a thorough gentleman. He invited me into his comfortable tent, where we sat smoking and drinking soda-water and lemonade—splendid!

After the agreeable Afghan had taken a portrait of me on my dromedary, I took farewell of him and the rest of the frontier guard, and we passed on up the valley. On a little spur to the left rises the important boundary column, where the three kingdoms meet. From this base the whole row of pillars we passed all the way from Bend-i-Seistan is visible, theoretically at least, that is, if one has good enough eyes or field-glasses and if the air is clear. They stand on a line which is drawn straight on the map.

At Siaret-i-Malek-i-Siah-Kuh we made a short halt. It is a pilgrimage resort with stone walls, a landmark, a pole hung with rags as offerings, and a holy dervish who holds in his hand a bunch of twigs by a handle. My servants had to show him due reverence. They went round kissing some upright stones and poles, and pressing their foreheads against them. They laid cakes of bread on two stones, afterwards eating them and sharing them with the dervish. Then they fired a gunshot at a stone on the other side of the valley. The rock is hornblende granite.

The road has now some appearance of a highway, for it has been cleared of stones and pebbles, which are piled in rows at the sides, and for some distance from the sanctuary the road runs straight as a line. It leads up to a small flat saddle, at the top of which we turn off at right angles to the south-east, after having, at length, passed round the annoying wedge of Afghan territory. We have risen consider-

269. Setting out from Kuh-i-Malek-Siah.
Photographed by Muhamed Ashref Khan.

270. My Riding-Camel on the Way from Nasretabad to Robat.
Photographed by Muhamed Ashref Khan.

ably (3934 feet), and with 71.8° at five o'clock the air is pleasant.

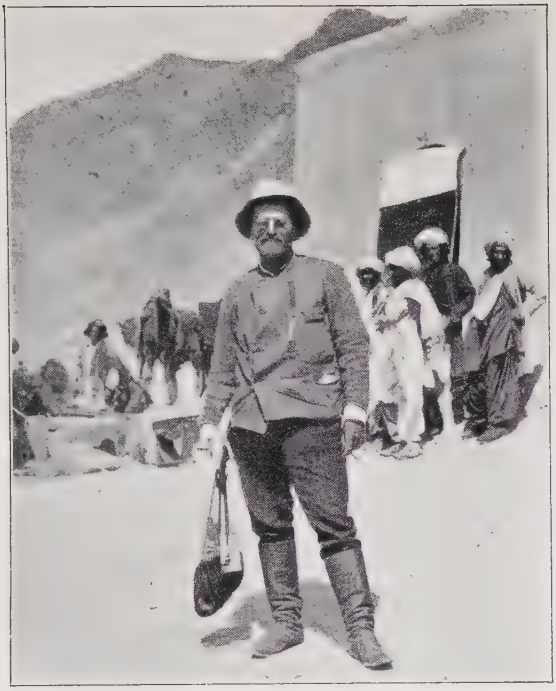
We are in Baluchistan, in a country ruled by Englishmen. We are on the sharp and still narrow wedge which points north-westwards, and have Afghanistan close on our left, and on our right Persia. I have been travelling across this country for four months and a half. It seems to have shrivelled up now that it is behind me, and yet how many weary days' march I have experienced in its deserts. I saw it again at the eleventh hour; it is now a kingdom divided against itself and threatening to fall to pieces. Only the rivalry of its powerful neighbours, England and Russia, keeps it still on its feet.

Now the wind is against us, now it is fresh and pleasant, and we have the declining sun at our backs. An English officer comes cantering up and introduces himself as Lieutenant White. He escorts me to the station-house of Robat (3245 feet), where Captain Dunscombe gives me a kind reception. He brings me letters and cheroots from Macpherson, shows me into a fine officer's tent, where I install myself for the night and take an invigorating bath, and then invites me to a capital dinner in the bungalow of Robat.

Next morning the staff of servants and the escort which had accompanied me from Nasretabad were sent home, and a new troop was mustered. Mr. Hughes, at the Consulate, had arranged matters admirably, and twelve fresh dromedaries waited for their loads and riders. I rode a fine, very tall jambas, proud, grand, and solemn, but somewhat peevish and vicious. He had a peg in his nose with a cord attached, and he could be steered by throwing the cord to the right or left of his head. The saddle was quite a large stage with two hollows, one before and the other behind the hump. Usually a jambas carries two riders, but I refused company, as I wanted a free view, and to use the front saddle hollow for my field-glass, photographic camera, and other small articles. One has a firm and comfortable seat on this singular saddle, which is very deep and provided with a back. The stirrups also give support, which is often necessary, especially when the dromedary starts and

kicks to free himself from gadflies. Had I sat carelessly, like a *charvadar*, or dreaming as usual, I should certainly have gone overboard more than once.

Now I sat enthroned on my picturesque bearer, and after hearty thanks and good-bye to the hospitable Englishmen I followed my new troop of Baluchis through the valley.



271. The Author at the Station-House of Robat.

272. A "Levy-House" on the Road to Nushki.

CHAPTER LVIII

AN EXCURSION INTO AFGHAN TERRITORY

Now we go along at a different pace from before. We do not scurry, we do not let our jambas trot as they can do, but take things quietly, for I must see the country and take notes, but still it is something different from the usual caravan saunter. The road leads between ridges of boulders and mounds of red conglomerate; the country becomes flatter, and falls towards the north, whither run all the small dells and ravines, and to the right rises the dark, jagged crest of the hill. We ride on the detritus fan from this hill, and follow its foot south-eastwards. The road is taken care of, all the stones being removed to the sides in two rows, leaving an interval of 15 feet, and it can be seen stretching far into the distance through this dreary, monotonous Baluchistan. The telegraph wires run close beside us on their grey-painted iron posts. They can be seen in a straight line as far as the eye can reach, and where the road vanishes on the horizon in a point as sharp as a needle. We made 24 miles on this day's journey, but it was still a long way to Nushki.

To the left are seen some marks on the Afghan boundary, and to the north extends a dismal desert, gently falling to the basin of the Shela and God-i-Zirre, and north of it we know that the Hilmend flows between its friendly banks, and with its superfluity of sweet water. The leader of the escort must just have thought of it, for he stopped and handed me an indiarubber bag with water from Robat. It tasted excellent, for now at one o'clock we had 84.6° in the shade, and the height was only 2490 feet.

To the right of our route stands a group of hills called Lar, and the valley which descends from it and is intersected by our road bears the same name. It contains a rivulet of salt water. A hill farther on on the same side is called Kuh-i-piran.

It is three o'clock when we are told that we are half-way. We cannot then reach the station before it is quite dark, and we long for the dusk to relieve us from the heat of the sun. The sun is dangerous in this country, and one may have a sunstroke before one is aware. The Englishmen advised me to be exceedingly careful, and I now began by winding a white pagree round my soft felt hat.

At some distance to the south there is said to be a spring, Leshker-i-ab, with sweet water, and one of our men rides to it to fill the indiarubber bag. Rud-i-piran emerges from the hill by a valley to the south. It is now dry, but its arms can be seen spreading out in a delta over the flat detritus fan. The land in front of us, therefore, rises, and the south-eastern horizon has come quite near. A succession of similar small, trumpet-shaped valleys pass into flat detritus fans, where the dry steppe shrubs grow more freely than elsewhere. At half-past four o'clock it is pleasant, the sun being hidden by clouds. Vast and boundless Afghanistan extends north-eastwards, and the ground falls towards its plains, which like a yellow, indistinct mist lose themselves on the northern horizon. It is an illusion that the ground seems to rise in this direction.

A white-clad man on a light-coloured dromedary appears out of the desert. He quickly draws near, his jambas flying over the gravel with a gliding gait. Ah, it is the man who went to fetch water from Leshker-i-ab. When he comes to the road we halt half a minute to refresh ourselves with cool water. And then we jog on again.

A particularly large erosion furrow, quite 100 yards broad and 13 feet deep, bears the same name as this blessed spring. At half-past five we pass close to the foot of the hill beyond Kanduk. The sun sinks into clouds, but through a rift it still throws its shining arches far across to the east, where they strike the ground at the shores of God-i-Zirre, white with salt. In consequence of a slight

273. My Jambas Grazing.

274. Camping under a Tamarisk.

275. A Fine Saxaul.

276. Among Close Saxauls.

mist, the surface of the ground northwards seems dark and confused, but some clouds hovering about the dark land are illumined and shine like huge melting hummocks of porous bluish-white ice.

We ride over hillocks and spoon-shaped prominences, forming extensions of small, far-outstretching offshoots of the hills; we ride over innumerable erosion furrows, all dry, but skirted by richer steppe vegetation, and the time creeps slowly on. The evening is coming on, the wind has fallen, but the mosquitoes are more numerous, the air is less warm than a little while ago, and we are glad that the heat of the day is over. We pass one projecting point after another, black, brown, red, purple, or in shades of green, and sometimes the yellow is a welcome relief to the dark hues. Beyond the red hill we see before us is Muhamed Riza's well, our camping-place for the night, the chief of my mounted troop informs me, and we quicken our pace while the twilight spreads its gentle wings over this desolate and denuded country, which loses nothing when the night envelops its nakedness in gloom.

Down below in the low country a white cloud comes rolling over the ground, going in the same direction as ourselves. It actually rolls on like a lava stream, and swallows up, bit by bit, the pale yellow flat land. Again the leader of the escort puts in his word, and says that we shall have wind, and I have no doubt of it, for I know this phenomenon only too well. When the storm catches us up the darkness increases, and everything becomes hazy and indistinct as in rainy weather. Mosquitoes, flies, and gadflies disappear, the air becomes cool and refreshing, and the dromedaries, as well as ourselves, enjoy the sudden change.

Night comes upon us, and we can scarcely see the dark domes of the hills. Now we go up and down among hillocks, and beyond the large bed of the Maki-cha we come to the bungalow at Cha-Muhamed-Riza, where a fire is made in the court to give light. While we are waiting for the caravan we sit round the fire smoking and talking and making out our programme for a short excursion to-morrow to the bed of the Shela. Being now only a day's journey

from it, I cannot refrain from riding thither, for it involves only an insignificant détour, and after a night in the open air we shall regain the high road near the bungalow of Kirtaka. Several Europeans have already visited this singular depression.

Our men turn up later, and my belongings are arranged in the room of the station-house, and Riza gets supper ready. The twelve dromedaries I have hired cost only 20 rupees a head all the way to Nushki. The Indian Government pays 16 for its transport. A good dromedary costs 100 rupees, or only 85 if the bargain is struck between Baluchis. My large Turkman camels were then, at least, twice as dear, but they were better and stronger animals.

With two mounted men and two *bellads* or guides, I ride on April 25 north-eastwards down to the plain country round the depression of the Shela and the God-i-Zirre. The bed of the Maki-cha can be followed for a good distance, and here cool shade can be obtained under its erosion terrace 23 feet high. But presently it becomes lower, and we come out on to a gravelly slope, and are on Afghan territory, as my guide informs me. Behind us the hills present themselves more and more clearly, while before us the plain country seems more at our own level. Yellow streaks indicate belts of sand.

When we come to the edge of the detritus fan at eleven o'clock, the landscape totally changes its aspect. We have come to a much lower level, the grey detritus slope is seen foreshortened as far as the foot of the hills, and we are down on the plain where the Maki-cha river deposits its silt. At the station-house we were at a height of 3524 feet, and now the aneroids mark barely half, or 1722 feet. The detritus fan slopes very evenly and slowly towards this depression.

After four hours of rapid march we came to quite a jungle of saxaul, and here my men asked for a rest. While the dromedaries went to graze, my coat was spread out on the sand in the shadow of a close saxaul, and I lay down to take my notes, while the flies buzzed, and there was a mild breeze through the foliage as on a bank in the country on a day in midsummer. The bushes rustled and whistled

277. The Shela.

278. The Shela.

Between steppe and low sandhills. A light patch in the distance to the right is God-i-Zirre.

so dreamily and pleasantly, with such a plaintive and mysterious moan. It was so solemn and lonely in this wilderness, whither man hardly ever comes. The sky was clear, and the wings of the flies glittered like diamonds in the sunshine.

Here we were half-way to the *leb-i-hamun* or the edge of the lake, as the men called it, and after half-an-hour's rest we went on again through quite a thicket of saxaul of a greenness which showed that their roots descended to the ground water, but these children of the steppe were not so fresh and of such a deep-green colour as the tamarisks. Among them the sand was higher, dunes as much as 20 feet high being passed, with their steep sides always turned to the south. Occasionally we rode over a flat bestrewn with fine gravel. It has the effect of oil on waves ; where gravel occurs no dune can be formed. On some stretches the dunes were very fine and of regular shape, and their forms indicated northerly winds.

We rode at a rapid pace. To-day I had a guide in the front seat, but sometimes, when the way was bad, he went on foot. On such an occasion, when I was sitting with both legs on the near side to have the sun on my back and the breeze in my face, my camel unexpectedly stopped, lay down on a sandhill, rolled on one side, and threw me backwards, so that I fell full length on the sand ; but my left foot was still in the stirrup, which was too small, and when the dromedary got up again quickly I should have been in a very nasty predicament if my foot had not got loose at the last moment.

We are in a sea of sand-dunes, all traces of vegetation have ceased, before us are seen some ruins on an eminence, and we ride thither and rest awhile in the long-abandoned village of Zirre. The walls of six houses still stand upright, while two others have entirely fallen to pieces. Here we leave two of the dromedaries and three men, while I go on with the guide.

Now the ground consists of hard yellow clay, where the north wind's ploughshare has left its deep furrows, and here brittle and withered reeds lie in strips and belts a foot high. The guide remarks that we are riding over an old

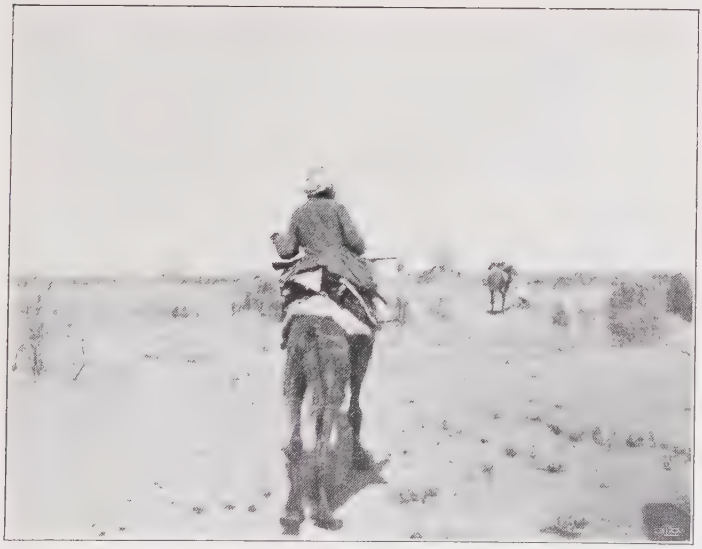
lake bottom, and that the former lake was sweet, at any rate round the margin, as is shown by the reeds which otherwise would not be found here.

Another hour's ride and we are on the right bank of the Shela. Its erosion terrace is steep here, and 18 feet high, while the left bank is a gentle slope, thickly clothed with bushes. The deepest part of the bed is full of salt water, on an underlayer of crystallized salt. The river runs towards east-south-east, but it is said to bend afterwards to the east and east-north-east, and to flow a good day's journey before it debouches into the Hamun-i-Zirre, as my man called the depression. This is said to be three or four days' journey in length and to contain no water, but its salt-impregnated bottom must be at least moist in parts, so that any one attempting to cross would sink in deeply. After unusually heavy rain and high water in the Hilmend it seems that ephemeral lakes are sometimes formed in the God-i-Zirre. The pools now left in the bed of the Shela, and becoming smaller and fewer down its course, are said to have been left by the last high water some few years ago. God-i-Zirre is, then, the ultimate and lowest recipient of the Hilmend system, though the water may now seldom reach so far. That this actually occurred not so very long ago is plain from the assertion of my guide that his father had seen inhabited huts on the Zirre. The guide was himself about forty-five years old. He remembered that, twenty years before, there was much water in the Shela, and that the swamp along the bank reached to the neighbourhood of the ruins of Zirre. According to M'Mahon the God-i-Zirre is a large lake of clear, deep-blue water, 25 miles long and 5 miles broad, surrounded on all sides by a broad ring of firm salt (*Geogr. Journal*, vol. ix. (1897), pp. 393 *et seq.*).

I determined the height on the bank with a boiling-point thermometer, and found it to be 1621 feet; we had, therefore, descended 1903 feet from Cha-Muhamed-Riza.

Over old lake bottom, where the extinct reeds have been succeeded by steppe vegetation, we continue our journey to the south-south-east, and are able to follow comfortably the erosion furrows ploughed up in the ground by the

279. Dunes at Zirre.



280. Returning to the Main Road.

prevailing wind. At a *gumbez* (a tomb) the other men are waiting. And then twilight comes again, and all the tones become indistinct; another night is falling over desolate Baluchistan. Our riders spur on their dromedaries to a rapid run through the bushy steppe, and when the darkness becomes dense we are again in the sandy desert. We cannot see the dunes and their outlines, but we know they are there by the gait of the dromedaries, and the animals seem frequently to be in danger of coming down a hill head foremost.

Now the great thing was to find a place with fuel, and then we arranged our simple camp among some dunes. I had not taken my tent with me, for it is always a pleasure to lie in the open with the sky for a roof and the camp fire for a light. But just as I was taking my evening meal a violent storm came from the north-north-west, and I had to hurry before everything was filled with sand. In the afternoon, on the bank of the Shela, the temperature was 85.8°; at nine o'clock it had fallen to 68.9°, and in the night it fell to 55.2°. The coolness of night is a blessing after the heat of the day. But in the suffocating cloud of sand that whirled about us, I preferred to have my fur coat over and under me, and before day dawned in the east we were half buried in sand.

Immediately beyond the camp we came to continuous sand with dunes as much as 30 feet high, but we found that we were no longer in absolutely deserted country, for we soon met a solitary old man with a donkey, and came up with three men and a dromedary. We had come into the road connecting the station Kirtaka with Bender and the Hilmend. A jambas can cover this length of quite 60 miles with ease in a day. There are two salt wells on the road, which are only resorted to in case of necessity. The three men said that several Baluchis live at Bender, and that they had left this "harbour" the day before.

The outlines of the hills to the south come again into sight, clearly but faintly, and at seven o'clock the temperature is above 68°. The left side of the body feels more comfortable than the right, which is in shadow and exposed to the morning breeze.

A winding passage between the dunes afforded us an excellent path; it had been made by some powerful flood from the hills, and by its side throve copses of luxuriant saxaul, with soft, drooping, beautiful green tufts. These children of the desert are charming in the great solitude, and their verdure harmonizes well with the yellow sea of sand around them. We rested in the shadow of the densest thicket. The dromedaries had to graze a while, and we gave them all the water remaining in the skins.

Here begins again the slowly rising slope of detritus which we cross diagonally to the south-south-east. The country is monotonous enough, and the hours pass slowly. But the dromedaries keep up a good pace, swinging their long shanks. The rolling motion is easier when I have a rider in the front seat; when I am alone my dromedary jolts me more.

The dark gravel is heated by the sun, and when the northerly breeze passes over it it is warmed. Sometimes we are surrounded by air as hot as though it came straight out of an oven. Far to the east-south-east new hills crop up on the horizon.

At three o'clock we cross the frontier between Afghanistan and Baluchistan. It is marked by a small stone cairn. At the rapid pace we keep up all day we cover long distances, and at length we see the mound at the base of which the spring of Kirtaka comes out of the ground (3278 feet). Nevengk is down at one of the basins drinking, and young Riza comes running up quite animated, calling out, *Salaam aleikum.*

They are models, these bungalows on the English road through Afghanistan; they are friendly, shady refuges for weary desert travellers, who long for their shelter like Alpine wanderers for an inn. All are built on the same plan, so the same house seems to be with one all the way. Owing to a colonnade, the sun never reaches the front. At right angles to this a passage runs right through the middle of the house. To the right there is a large room for servants, to the left one for sahibs. The latter is furnished with a table, two chairs, a comfortable easy-chair of the kind used on vessels in tropical seas, and a bedstead. There

281. A Station-House on the Road to Nushki.

282. Some of my Men in Double Saddles.

are mats, curtains, a lamp, a shaded candlestick, and, for winter, a fire-place. Nor are enamelled services and the necessary cooking-vessels wanting. But best of all is the bathroom with washing utensils and a bath, and the first thing I do when I arrive in the evening and when I get up in the morning is to take a good bath, for only there can I enjoy the pleasant feeling of coolness.

They are, in short, ideal, these station-houses. In them the air is much cooler than in a tent, and in winter they afford shelter from the biting storms. The only complaint I can make of them is that the door of the bathroom is an inch too low, so that I strike my head every time I go to take a bath, naturally forgetting to bend my back before I have banged my forehead against the lintel. Scorpions and tarantulas must be looked out for before installing oneself in a bungalow. At this time of year the windows and doors must be kept shut during the night, or one is eaten up by gnats, and therefore one cannot enjoy the cool breeze.

The salt in the spring water of Kirtaka is not noticeable when the water is drunk icy cold, but now that it is tepid one cannot escape the nauseous, bitter aftertaste. The station overseer said that strangers are often made ill by drinking from the spring in summer, but that the water had no deleterious effect now. Summer, with its great scorching heat, would begin in a month or more, and is reckoned to last for four. The Baluchis can drink the water with impunity at any time. At most stations there is distilling apparatus.

The great slough, which extends to the north at the foot of the detritus fan, is called Navord, and is almost barren. After heavy rain masses of silt are carried into it. After it has dried, and when the wind of 120 days' rages, the ground is cut up again. Water and wind contend for the mastery, and the solid matter is a ball in their hands.

At the sensible suggestion of the caravan men a change was made in the order of march, the caravan travelling by night. With me were carried only my bed and things I might want on the way.

Our road runs for an endless distance straight to the east-south-east on April 27, and as we ride towards the sun,

it is broiling hot quite early in the morning. The watch in my vest pocket is so hot that I can scarcely touch it. At nine o'clock we take our first draught from the india-rubber bottle, which is wrapped in wet canvas to keep the water cool by evaporation. We perspire very freely, and have to drink a deal to keep ourselves cooler. As to sun-stroke, it may arise from some continuous heating up of the brain substance, caused by direct and particularly powerful insolation. I wear thin, dark-blue clothes, and the watch in my pocket is much warmer; but if I keep a white pocket handkerchief over the pocket the watch does not become warm. Similarly the brain is protected by an Indian helmet. For want of one I have wound a bath towel round my felt hat, and when there is a breeze, I lift the whole contrivance from time to time, and thus obtain a pleasant freshness.

The detritus fan is slightly uneven. In the hollows our view is limited, while on the eminences it extends to the distant horizon. A small dark knoll appears in the east-north-east, rising out of the sandy waves of the desert sea. We are much surprised when the road turns off to the south, rises to the foot of the hills and enters a valley between barren weathered hills of grey porphyrite, where the heat is more oppressive than on the plain, for there we have the benefit of the slightest breeze, but here we are sheltered, being surrounded by dark heated cliffs. A post courier comes jogging along on his jambas, and a *dukandar* or tradesman is conveying his goods on several dromedaries to Seistan. From a small saddle (3560 feet), in compact limestone, we see in the sunshine the bungalow and the other buildings of Saindek, and we hasten thither (3409 feet).

Here is a dispensary and a native doctor, who asks if any of our party has the plague. Here is a post and telegraph office and a banyah's shop in the bungalow, where rice, cakes, and matches may be bought, but nothing else. A community of Baluchi shepherds had their simple stone and earthen huts near by, and I paid them a visit on the following day, which was devoted to rest. They owned sheep and goats, were poor and ragged, and very like their Persian cousins. Their flocks must be easily satisfied

when they can keep alive in this desolate and niggard country. Near Saindek lead-glance occurs, and some pieces were brought to me.

86.2° at one o'clock! At the same time it was twelve degrees lower in the bungalow. By day we are persecuted by flies, in the night by gnats. Late in the evening the caravan got ready and vanished quietly in the night without the sound of bells. I went out with my shaded light and watched it depart. Then one of the hairy, poisonous spiders came creeping in among our party, and there was a jumping and screaming and a commotion as though fire had broken out. At last a man of the escort stamped the creature to death.

On April 29 we set out at seven o'clock with three dromedaries and water for two days. The road leads between small weathered hills and crests of dark compact fossiliferous limestone called Kuh-i-Saindek, Kuh-i-Amelaf and Malan-kuh. A small saddle had a height of 3678 feet. At the little *tana* or military post of Amelaf, a quadrilateral wall, with towers at the angles, the grazing seemed to be good, and water is found here, though not quite sweet.

We follow for hours a broad, flat, longitudinal valley between two crests, which become lower towards the south-east. A south wind begins to blow and increases after mid-day, driving yellow pillars like smoke before it; but this wind is burning hot as though it came from a baker's oven, and does not cool us like the fine north wind in Seistan, for it comes from heated desert lands, while the north wind comes from cool regions. At one o'clock the thermometer marks 95.9° in the shade. That is a great jump of more than nine degrees from the last previous maximum; but I feel that I can endure several degrees higher before becoming giddy. The worst is that we are riding straight towards the sun, and are exposed to its direct rays. I dismount and walk a little, but this is worse, for the ground is so hot that I cannot put my hand upon it. It is better to be a few feet above it. A few light clouds float across the sun, and I lift my hat to let the south wind blow through my hair.

Again we come among small ragged hills of porphyrite and uneven ground. North of the road we are following runs the old road between Saindek and Cha-sindan, where we, in four days, shall come to the old road again. This is abandoned, because it is becoming sanded up, and because there is no water to be found for three days' journey, and the traveller runs the risk of dying of thirst, a fate which lately befell two men. On the new road, which has been in use four years, there is water at every stage, except Burgar (3176 feet), the end of our day's march.

Burgar is the name of a hill north of the place where my tent was set up. It was dreadfully hot inside, and at seven o'clock in the evening the thermometer marked 88°. When the caravan shortly after made ready to start, and my tent was packed up, the tent bed was laid under the open sky, and soon the night breeze began, scaring away the gnats. The moon shone brightly, and the stars twinkled in the warm desert air. But the wind had dropped by two o'clock, and before I awoke in the morning I had been thoroughly devoured by bloodthirsty insects.

283. Two of our Running Dromedaries.'

CHAPTER LIX

THE ROAD THROUGH BALUCHISTAN

When the minimum has been 70.3°, not much can be expected of the day. The sun rose bright and clear, but by seven o'clock it was concealed by clouds. We bless this natural parasol and hope it will remain till we are at the next bungalow. It makes the light also more subdued. In the sunshine I am almost blinded in double snow spectacles by the tremendously strong reflexion from the ground.

Accompanied by Nevengk, who had come back in the night from the caravan, we set out at six o'clock and steer a course due east. To the right we have a low ridge, to the left one a little higher, but the ground slopes down to the north, and the erosion furrows from the southern hills cut through the northern. The country is slightly hillocky, absolutely barren, and bestrewn with reddish and greenish-purple pebbles of limestone, tuff, weathered porphyry, all rocks which occur *in situ* at a little distance.

Dreadfully monotonous is this country. For hours the scene does not change, and I can quietly sit and read on my dromedary. To the east it is raining over a small area, but to the south the sky is clear. If only we can reach the station before the clouds disappear! The telegraph wires hum beside the road. Political secrets are running to and fro along them.

Before nine o'clock the zenith is quite clear, and at one o'clock the thermometer shows 91.8° in the shade. Now and then a gadfly shoots like an arrow through the air,

circles round the dromedary, and vanishes. We ride past a fairly high isolated hill on the north of the road, called Kuh-i-delil. To the left the country becomes more open with sporadic hills. Here the ground dips southwards. We are, therefore, on a swell in the earth's surface which drains to the God-i-Zirre on the north and to the Hamun-i-Mashkel on the south.

The leader's welcome signal, "Here is the bungalow of Humei," we hear at last, and as soon as we have reached this haven (3287 feet) I make for the bathroom. The house is smaller than the last, but it is more occupied than usual, for a little after me comes Mr. Ogilvie from Quetta, with six soldiers and a train of twenty-five dromedaries. He is a very agreeable and excellent young man of twenty-four years who, in the quality of Great Britain's first consul in Bam, is on his way to his new post—quite a banishment, for in Bam he will be the only European.

A third traveller also was at Humei, the merchant Suliman Ji, who was carrying Indian goods to Seistan on a hundred dromedaries. He had just received a letter from Ashref Khan, warning him of the plague and stating that the inhabitants of Seistan were either dead or gone away. Ogilvie advised him to carry his goods to Bam and Kerman.

We set out later than usual on May 1. We had not gone far before I missed Nevengk, but when we called to him one of the men of the station led him up, and he followed us for a while. At a shady bush he scratched up the sand and laid himself down and took no notice when we called him. He was right; he knew best himself that he could not endure another broiling day. So I had that morning for the last time regaled him with bread and the remains of my breakfast, and the faithful dog which had come with me all the way from Kerim Khan would, I supposed, meet with new fortunes, when I sent him a farewell look.

The day's march led us through the same dreary country as before, insignificant red and dark hills of greyish-green diabase, limestone and granite, barren dunes, dark

284. A Group of Baluchis.

gravel and thin shrubs. At Meshki-cha (3077 feet) is a windmill and some palms — an unusual and refreshing sight—and an excellent bungalow. The palms grow at a *siaretgha*, or pilgrimage resort called Siaret-i-Sultan, with a stone wall, two tombs, and ragged streamers. Meshki-cha has also a post and telegraph office, and I received a very friendly greeting from Major Benn in Nushki, who informed me that all the *tanadars* or station chiefs on the road had orders to do their best to serve me. There are also two levy houses, a serai, and a shop. We could buy sheep, fowls, eggs, milk, and sugar, and lived grandly. There are several springs about, more or less brackish. One of them, which shoots up at Siaret-i-Sultan, had a temperature of 71.6° at the orifice and formed a little pool where dromedaries are wont to drink. At some distance north of the bungalow is a spring of good sweet water, where we filled four india-rubber bottles for my use. The Baluchis do not mind the salt water at the two following stations, but unaccustomed travellers, it seems, suffer severely from indigestion if they drink it.

Who should appear at the door in the morning but Nevengk, who came running in as quietly as if nothing had happened, wagged his tail, and seemed to advise me to keep still in the shade till the cold of winter came again. The pleasure of re-meeting was mutual, and the dog, who had followed our track in the night, got a solid meal of meat and water. I expected that henceforth he would run after us in the night, but when we set out in the morning, and he lay still in the bungalow, our parting was the last, and no more was heard of him. But I gave orders that if he remained at the station the attendants were to treat him kindly, and let him follow some caravan back to Persia.

Near Meshki-cha we pass a deep erosion furrow called Rud-i-roghane, coming from the Damudim hill and running south-south-east. There is a little breeze in the morning and the sky is wofully clear, and we have the sun in our faces. Between east and south the horizon is as level as a line, and the road runs straight as far as we can see towards east-south-east. Stones have, as far as possible, been

removed to the sides to keep the path clear, but sharp pebbles are still left, very painful to the pads of the dromedaries. One of our men walks barefoot, but they are too sharp even for his tanned soles, and he takes to his shoes again.

Such the landscape continues hour after hour. A small belt of dunes runs to the right of our road and then gradually moves away. Mirage causes them to appear to be lying on the shore of a lake, reflected in the calm surface, but so that their images are several times higher than the originals.

Two hours more pass by. The landscape remains unchanged; the low, yellow pyramidal peak of Kuh-i-Sultan towers above a red sharp-topped ridge with gently sloping detritus fan. To the south stretches boundless desert with dunes at a still greater distance. Blue crows sit on the telegraph insulators and fly from post to post before us. Here and there we pass the dried-up carcase of a dromedary, with neck bent back—foundered ships of the desert.

Two hours more; one o'clock, and a sling thermometer marks 98.4° in the shade. The height is only 2674 feet. The heat can be seen vibrating in the air along the road. Sometimes there is a shallow furrow with a couple of withered shrubs. Twice we pass small open-air mosques or oratories of the simplest construction, a ring of black stones with a cairn or altar on the side towards Mecca. A small path fenced in with stones leads from the road into the roundel where travellers can perform their devotions before the day is over.

Yonder in the distance is seen the bungalow of Kundi (2470 feet). It seems to hover a little above the horizon, another effect of mirage. More dead dromedaries which have not been able to march farther. Two ravens keep watch over the mouldering remains.

The next day's journey brings no change. The landscape is the same as yesterday; the only difference is that the telegraph posts now stand on the right of the road. To the north we have low hills, and to the south the country slopes extremely slowly towards the Hamun-i-Mashkel. We ride

285. Nomad Tent.

286. Nomad Tent.

north-eastwards, the air is quite calm, and we hurry our pace to get a feeling of draught. It is so still that we can hold a burning candle in the hand. At one o'clock (2513 feet) it is 103.8° in the shade; we feel as if we were travelling in an oven, and our sight is blurred. The great heat has taken us by surprise and we have not much to expect from the coming days. The rest for breakfast is a short relief to the monotony of the day. But it is not particularly refreshing. A cloak is spread over the ground, which is burning hot, and we might as well be sitting on a hearth. The water is flat and its unpleasant taste comes out. But, at any rate, it goes down with the help of cakes and jam, and then we can perspire.

We are at the bungalow of Trato (2549 feet). Its well is 8.14 feet deep and the water has a temperature of 72.3°. At seven o'clock it begins to blow hard from north-north-west, but at nine o'clock the temperature is still 81.3°. In the bath it is 73°, but in the bungalow I am almost suffocated by the dry, close heat, and therefore I have my bed carried out into the wind and lie almost naked to keep cool. The wind is variable, and long before midnight it is calm again, and I am attacked by gnats and have to creep under the rug. Steps should have been built up to the roof of the station-house, where one would be in summer more exposed to the wind, and raised a little above the heated ground.

Why do not Englishmen travel with motors on this Trade Route? They could drive a swift untrammelled course from Nushki to Robat in a few days.

It is blazing hot shortly after sunrise. No clouds, no breeze, but a light haze hovering over the earth. In the southern heaven the sun mounts up so high that the mist cannot modify its heat. Only the landscape becomes indistinct and the small hills in the distance disappear.

Grey, barren, and dreary! One can hardly imagine a more God-forsaken wilderness than this. After two hours we cross a poor belt of steppe, where greyish-green grasshoppers sit in clusters on every shrub, and when we disturb them hop away. Gadflies persecute the dromedaries and stinging flies irritate and tickle their noses, so that they are

always snorting and puffing to get rid of their obstinate tormentors.

A belt of extraordinarily regular dunes is crossed by the road. They are as much as 13 feet high and stand 100 yards apart, never running together. The intervals between them are quite free of sand, only here and there a skeleton of a dromedary being imbedded in sand. The dunes are crescent-shaped, but their points are drawn far out to leeward, and their position indicates a north-north-west wind. The whole collection of dunes is therefore moving south-south-east. Probably they are formed at some distance to the north, and are probably dissolved and disappear somewhere to the south. But just where the road runs, and where all the conditions for their construction are present, they are modelled by the wind. They are ephemeral formations which cross the desert like phantom ships. When it is calm they remain immovable as tree stumps. When it blows hard the sand whirls around them and continues its course towards south-south-east.

One of the largest stood now in the midst of the road. Therefore a path ran out to the left round the windward side of the dune. It was much worn as if the dune had not moved appreciably for some time. But 20 yards outside this path there was another which showed that the dune had advanced from this direction. It only needed a summer's storms to sweep the sand-hill out of the way.

Another dune was crossed by the telegraph line between two posts. The highest part of the rounded crest would have come in contact with the wires if a temporary support had not been set up in the middle of the ridge to raise them.

We crossed three strips of dunes, and they seemed to start from three gaps between small hills to the north of our road. They seemed to be so far independent of the configuration that they crossed two erosion furrows 6 feet deep without any marked break. There was a slight breeze, and now and then a close eddy of yellow sand glided like a spectre to the east-north-east. Such a vortex remained for a moment still, humming on the middle of the crest of a dune and sucking up the sand like a pump

287. A Nomad Tent.

from its sharp ridge. It looked as though the dune were smoking, and in the burning heat one could almost expect to see flames burst out. Another cyclone rushed right over us with such furious violence that the dromedaries began to run to get out of its embrace. I had to press my knees in tightly, not to be swept off the deck.

The desert stretches almost mournfully silent, light and hot in all directions round the little bungalow called Cha-sindan (3061 feet). Only milk can be obtained at the place, but its poverty is amply compensated for by its splendid water, the best we have had since the Hilmend. The well is quite 30 feet deep, and had a temperature of 73.6°. There are other wells around. We drink copiously and perspire profusely; we are in a Turkish bath all day long, the pores are always open and the water drops from them. The first bath on arrival is the most delightful hour of the day, and it is almost worth being tortured for hours to enjoy it the more. Afterwards I sit in the easy-chair and read, and at seven o'clock I go out to see the caravan start, accompanied by Riza.

I have made a Stanley hat of a Swedish newspaper, which is more useful than becoming. I folded up the whole sheet into a long strip which I then rolled round spirally, sewing it together ring upon ring into a beehive.

I could stay for hours watching the large beetles in the courtyard rolling to their warehouse marbles of dromedary dung, which these small, persevering labourers have scratched out of hard clay ground. They go backwards and roll the marbles with their hind legs. At small rises the balls roll back, but the insects begin again, and succeed in the long run. They teach us patience, and some time or other we shall certainly come out of the desert. There is a region in south-western Afghanistan called the Desert of Hell. The name would be equally appropriate for north Baluchistan.

East of Cha-sindan a large flood-bed runs down towards the Hamun-i-Mashkel. It comes from the hilly tract Melknaru, north of the road, and gives life to a little vegetation of tamarisks and steppe plants. To the east of it gravelly soil extends again, where we crossed a whole

migratory stream of light-green grasshoppers, which hopped across the road in dense troops. We passed two more such processions. There is a continual rustle on the ground as we tramp right through these living streams where several wanderers are crushed into pulp.

Beyond a large hollow with tamarisks, with roots going down to the plentiful ground water, the oasis Maligat-i-barut comes into sight at a small saddle, and here there are two rather deep fresh-water wells sunk through the pebbles. But the most astonishing and attractive sight here is a grove of fifty or sixty palms, some quite tall, fine, and graceful, and a charming contrast to the yellow scorched desert. They bear little fruit and look sickly. There is no human being here now, but the fronds swarm with grasshoppers, and a snake creeps into a hole under a root.

Now we come amongst black hillocks of weathered quartzite. The stones on the ground are so hot that it is impossible to hold them in the hand. When we rest a while at one o'clock it is not worth while to sit on the ground—we should be soon up again; the heat can be felt even through a cloak. It is strange that the dromedaries can bear to be always touching the ground with their foot-pads. It is 106° in the shade. But india-rubber bottles are a blessed invention. Through the rapid evaporation to which they are exposed, the water is cooled down to 72°, far below the temperature of the air.

Beyond a small promontory the bungalow of Merui (3048 feet) appears, surrounded by sandy ground and numerous dwarf palms called *pish*. It is well situated in the valley, but from the bare heated cliffs the warmth radiates fiercely. And this is good for snakes and scorpions.

Here there is a telegraph station, the head of which helped Riza to prepare a Hindustani dish of mutton; a *deffadar*, or inspector of the mounted post, and a post-office, where the master took charge of my letters. They were Mohammedans from the Panjab, civil and agreeable. The deffadar had his family living in a black tent of goat's hair. He only is a Pathan or Afghan, and the Baluchis here are called Brahui.

288. Four Baluchis.

289. A Landscape in Baluchistan.

Several wells yielded good sweet water, and there are, it seems, others in the hills around where the nomads have their haunts. At some places kanats are digged after the usual Persian pattern. I was told that sometimes in winter it is so cold that men who have been caught in the icy blast have been frozen to death. The season from November to March is called *bahar*, because the grass is then green; bahar is also the Persian name for spring.

On May 6 we rode over rough country between small hills and hillocks, through ravines and furrows with boulders, round which tamarisks were quite common, and often as large as a tree. The heat rose to 101.3°, and it blew briskly from the south, but it was a dry, hot, and suffocating wind. At the bungalow of Sotag (2858 feet) there was only a man and boy to look after the station, the wells were brackish, and the room full of gnats during the night.

The road to Cha-kul (3169 feet) ran partly over uneven ground, where thriving tamarisks were very conspicuous with their fresh foliage, partly over open and desert land, hard ground with dark gravel.

On the night of May 7 the temperature dropped to 66.6°, and when I woke, just after four o'clock, I felt quite cool. I had been besieged by gnats in the night, and had no objection to going out into the air, where I could keep them off with an Indian cheroot. Mustapha Khan, chief of my bodyguard and general factotum, reminded me that the way was long to Dalbendin (19 miles) and that we must set out early. However, I need not have been in such a hurry, for when I came out it turned out that our dromedaries had made off. Scouts had been sent out, but nothing had yet been heard of them. Then Mustapha disappeared also, and I sat in an easy-chair in the verandah, reading and enjoying the cool air. The neighbourhood was silent, only dung beetles were at work, and the grasshoppers hummed everywhere.

The men did not come till nine o'clock, having found the dromedaries 6 miles off. But when one of the two which carried light loads was to be laden, he took it into his head to refuse. After a long attempt to get hold of

him we gave it up and went off with the two dromedaries, leaving a man behind with the refractory beast.

Gravelly eminences and valleys clothed with vegetation alternated as heretofore. In one of the latter the grasshoppers were so thick that we had to ward them off with our hands that we might not have them on our faces. It was calm and still, but sometimes a gust of wind came from one direction or another. To the right of our road ran a large longitudinal valley with a not inconsiderable belt of sandhills. Here and there were seen nomads with dromedaries, sheep, and goats. During the hottest hours of the day the last take shelter under the luxuriant tamarisks.

After riding up and down a while among hillocks we came again on to a plain stretching far before us to the east. The bungalow of Dalbendin was the best we had hitherto seen, snug, roomy, and well kept (2913 feet).

The next day's journey brings us to Karabuk (2871 feet), and on May 10 we ride to Yadgar-cha. Here, too, we are at a height of 2871 feet—the differences of altitude are in general very slight on this road. To the right a belt of quite high sand again lies, but south of it is cultivable land, wheatfields, and at the foot of the hills villages with fruit trees. The road runs in zigzags to avoid projecting points of the sandy area. The heat is not so bad, for the temperature is only 96.1°, after 60.8° in the night. But the sun is hardly up before beetles and grasshoppers are about. The latter destroyed the wheat three years ago.

The bungalow of Yadgar is placed in a small flat hollow with ground of silt level as a floor, and through this the well is sunk to a depth of 25.1 feet. The water is turbid, but quite sweet, and it had a temperature of 73.8°. The place presented a very lively scene, for the nomads were there to water their animals. There were quite 500 dromedaries, 200 sheep, and a number of asses. The dromedaries lay down in groups after drinking. They would get another draught before returning to their pastures. The men were bearded and copper-brown, and wore a white turban bandage round the head, and only one other garment, a pair of wide trousers. By means of a roller resting on two posts, they

Jambas or running dromedaries.

wound up the water in skin bags, and emptied it into a shallow clay basin. When this was fairly full the dromedaries came up and pushed one another to find room to reach the water with their long necks. The scene was too picturesque not to be perpetuated on a cinematographic film.

Only four days more to Nushki! The night has been beautiful; I always lie outside now. But still we have the sun straight in our faces during the early hours, and it burns like fire a short time after sunrise. To-day, May 11, the temperature is up to 104.7° again. First, a belt of hillocks, and then we are out on the level green steppe, where the road runs straight as a line as far as the eye can see. The southern hills are distinctly visible with their bare, rugged flanks, and close to on the south grow large tamarisks, where nomads dwell with their herds; we cannot see them, but the dromedary mares are heard bellowing after their young.

To-day it feels warmer than ever, and the only breath of air perceptible proceeds from our own motion. The air is polluted by millions of fine particles raised from the ground by the rising heat currents. Not a wisp of cloud floats across the sky to rob the sun of its heat for a moment. We perspire profusely, and long for evening and night. Then we lie awake, and feel the slight breeze becoming gradually fresher as night advances. Then we think with satisfaction of the accumulated heat of the day radiating out into space, and enjoy the cool as we should a bumper of ice-cold sparkling wine. By day my thoughts often turn to the crystal-clear rivers in the Himalayan valleys and the fronts of the glaciers, where the melted water drops and splashes.

After six hours' ride we come to the first shade on the way, under two tamarisks, and here we halt for breakfast, water and cakes as usual. I wish to take two plates with my little Verascope camera, but I nearly drop it, for it is burning hot, and I have to wrap it round with a handkerchief. The rest in this shade is so little refreshing that we soon want to get on the dromedaries' backs again, where at any rate we are 6 feet above the ground. It is vain to

look for the eddies that foretell a storm and the rush of the yellow-stained wind.

To-day, also, millions of grasshoppers swarmed on the ground. We saw their tracks on the sand dunes, fine confused points ; they sat in dense masses on the tamarisks, and under their voracious jaws the plants seemed to droop and fade before our eyes. These pests of vegetation are as detestable as the beetles are lovable, working through the day as they do, and at night sending an organ-toned boom through the air in the moonshine.

At nine o'clock in the evening the temperature was still 90.7°, and the bungalow and bathroom of Padak (2874 feet) were occupied by other travellers—whole swarms of these saucy grasshoppers.

A Palm Garden in Tebbes. North and East the Outline of Kuh-i-shuturi.

Kuh-i-shuturi and Kuh-i-jemal from Pervadeh.

Kuh-i-deh-no, and in the Distance to the Right, Shah-kuh. View from Hauz-i-hatam towards the South-East and South.

View North-Eastwards from Mal, near Nushki.

CHAPTER LX

TO THE END OF THE JOURNEY

Thick clouds covered the sky during the night and prevented radiation, and therefore the suffocating heat remained lying over the earth. But on the morning of May 12 the sky was clear again, and we looked forward to the 29 miles before us with some uneasiness. The hills to the south were now quite close to us. From Dalbendin the country has no appearance of desert, but is steppe where the grass shines green in the broad, open, longitudinal valley. Here numerous dromedaries and sheep graze and deep irrigation canals run, an unusual sight.

Here, also, the grasshoppers are in clouds, whizzing and rattling over the road, lighting on the dromedaries and riders, and interfering with our progress. Alijo is the name of a fresh-water spring, which breaks forth in a hollow below the road, and forms a brook of almost standing water. Thousands of yellow grasshoppers find it best to swim over this obstacle; they could very well hop over, but probably they like a bath.

Barren country with salt hollows, hills, and mounds, and then steppe again, and when we pass Kuchik-i-cha, where a small bungalow is erected, we know that we have travelled 13 miles and have 16 more. No one who is not obliged stops here. The locality has a bad repute for the abundance of its gnats. We pass on, therefore, with tamarisks on our left, and dark, hilly projections on our right.

In the bungalow of Mal (2943 feet) I received in the

night a farewell visit from gnats. I wrapped my head in a soft cloth to protect my face, but I had to leave my nose and mouth free to breathe in the heat, and the gnats concentrated their energies on my lips. But what did it matter? I was glad when I awoke on Sunday, May 13, that it was my last day on this endless road through Baluchistan.

We now travel through fine pleasant country past picturesque hills and stately tamarisks, and the only depressing sight is the wheatfields, thin, drooping, and with broken stalks, the work of the grasshoppers. While the natives with their wives and half-naked children try to save all they can, these detestable insects sit whirring and gnawing and devouring the poor crop. In their joy of existence they fill the air with their monotonous rattle; fortunately they appear in such quantities only in certain years. It is vain to fight against them. They are heard rustling everywhere among the yellow bitten blades, and whole patches lie on the ground as though a scythe had passed through the grain. Sometimes a small corner of a field has still escaped their ravages.

No huts or tents are visible, but donkeys are heard braying and dogs barking. The telegraph line follows us closely with eighteen posts to a mile. In the shadow of a tamarisk we take our last breakfast in the open air, the usual simple repast of tepid water and cakes. There is a breeze from the west, and the temperature rises to 106.5°, the highest reading on this journey.

The village Amed-wal (3212 feet) consists of huts of boughs, twigs, straw-matting, and clay. The whole population is engaged in hastily harvesting their wheat to anticipate the grasshoppers, though some of the fields are still quite green. They cut the grain with small sickles, which is loaded in sheaves on oxen, and hurriedly carried away for safety. It was touching to see even small children dragging the straw to the rick and striving to rescue the valuable crop.

We stayed several hours at Amed-wal. I took a bath in my tent, rested, supped, and late in the evening mounted my tall dromedary again. And then we plunged into the

291. A Baluchi Boy.

night, marching north-eastwards. The glittering stars struggled in vain to pierce the darkness, but I enjoyed the night journey, for every quarter of an hour that passed the air became cooler as the night marched gradually over the earth. I sat dreaming and meditating; it was May 13, half a year to a day since I had left Trebizond. Turkish Armenia, Persia, Seistan, and Baluchistan lay behind me, and now only India and Kashmir separated me from Tibet.

We cross several canals with water; I cannot see much of them, but I recognize them from a distance owing to the croaking serenade of the frogs. I am spared this night the dance of gnats, but my face and hands are swollen and burn like fire. The night is quiet; dogs bark and horses neigh in the distance.

Now my steed halts, and Mustapha Khan says that we have arrived; this is Nushki, but all is dark and still. We unload our animals, and in a quarter of an hour I am asleep in the waiting-room of the railway station.

Next morning I bade farewell to my honest Baluchis, who had served me so well and faithfully, put Riza in an ordinary compartment, and took my seat in one of a better class. How strange to hear again the steam whistle of the engine after half a year of the immense solitude of the desert!

Mustapha Khan and the other men remain on the platform and watch us till we disappear round the first corner. A rise begins at once, and the engine has all the difficulty in the world to draw the train along, and it seems as though it might stop at any moment and roll back. This is not owing to the gradient, but to the grasshoppers which are crushed on the rails, so that these are smeared with grease. This terrible plague has extended to Keshingi, and everywhere the people are engaged in saving their grain.

At the last-named station were Major Benn and his amiable and excellent wife to greet me and present me with a splendid breakfast basket. The train was allowed to stop a while that we might talk, but I was ashamed of my appearance, for my costume was not suited for a lady's

company. Fortunately my Stanley hat of newspaper had gone into the fire the evening before.

And then the train crept on in innumerable winds among the hills. We mounted considerably, and the temperature fell hour after hour just as on our nocturnal ride. Never have I enjoyed a railway journey so much. I was alone in the compartment, smoked, read, and ate Mrs. Benn's breakfast. How delightful to be in really dense shadow after the long days of burning sun! Outside the country lies bathed in light and heat. Yes, shine on as you like, cruel sun, you do not trouble me at all!

Galangur, Kurdagap, Sheikhwasil — high-sounding names for these small dreary stations on this extreme western tentacle of the great Indian railway network. To the last the train winds up among bare, scorched cliffs.

There is a sound of drums. A bridal procession passes by—the women in red dresses and simple ornaments, the men in white clothes and white bandages round their caps. Most of them walk, but ten dromedaries are ridden by wedding guests. All are bathed in sunshine, and dark shadows lie beside the gaudy colouring, and round about extend the warm waste lands and the heated hills. The procession sweeps by like a dream, and I have hardly time to fix the scene in my memory before all has vanished, and the roll of drums dies away in the distance.

At Kanah we meet a train; at Mastung, gardens and green fields attract the eye. A woman, clad in yellow, sings in a low tone as she walks under the shady arches in a park. At five o'clock we are in Quetta, where Captain A. L. Jacob meets me, having orders to look after me.

Quetta lies at a height of 5512 feet, and therefore is quite fresh. At Nushki we were at a height of 3051 feet, so that we have mounted considerably during the day's journey. In Quetta all the conveniences of life are to be found, luxuriant gardens and parks, fine and elegant houses, broad good roads, where one can always ride or drive in a *tam-tam* for long distances. There is a garrison of 5000 or 6000 men, including two regiments of English soldiers, two batteries, and also heavy artillery. And there are amiable and excellent men, English officers, who, with their

292. Mustapha Khan and my Bodyguard of Baluchis.

wives, do not know how to do enough for a stranger who pays a flying visit to their circle. There are shops which can hardly be surpassed in Regent Street, where the same stranger makes large purchases; yes, in Quetta everything can be obtained, and there peaches, grapes, and plums ripen in June. But the winter is severe, and then it is not easy to keep the lofty rooms warm.

I spent five delightful days among the officers of Quetta. The political agent, Mr. Tucker, and Majors Archer, Tottenham, and Roddy showed me every attention, and in General Smith Dorrien's house I had a fine time. He had served under Kitchener in South Africa, and his table was decorated by a silver service presented by the people of England.

On May 20 I took leave of all, and lastly of Riza, honest young Riza, who was quite brisk and sunburnt, and had developed no sign of plague. He stood quite downcast looking after me as the train rolled out of Quetta at four o'clock. I had made arrangements for a comfortable and safe journey for him back through Baluchistan; but, poor fellow, I thought, to have to ride along that everlasting road again in the sun, which would be still hotter now, and to return to Seistan, the plague-stricken land!

The way through valleys and tunnels down to the Indus is extremely picturesque. Though evening and night are coming on the heat increases with every hour. In Kolpur at six o'clock it is 78.4°; at Mach, barely an hour later, 93.2°; and at Peshi, at eight o'clock, 98.6°. It is like the mornings in Baluchistan, where the heat increases after sunrise. In Jacobabad we are down on the Indian lowlands and in the district which is considered the hottest in all India. But the windows of the compartment are provided with an excellent contrivance for ventilation—a lattice of root fibres, which is automatically sprinkled with water, and a draught is forced through this screen.

In the middle of the night the train rolls over the great river, Alexander's river, and with the turbid current of the Indus on the left and the vast plains of the Panjab on the east the railway runs north-east. It is suffocatingly hot in the compartment, and the Indian summer vibrates like

overheated steam out on the plains. But soon appears a background of heights, soon the fall of fresh brooks is heard. Up yonder the cooling winds sing among the Himalayan cedars of Simla, and still higher, beyond the eternal snow, is the land of wild asses and yaks.

Overland to India.

MAP OF
Dr. Sven Hedin's Route
from
TEHERAN to SEISTAN

Scale, 1: 1,500,000

10 0 10 20 30 40 50 60 English Miles

From the original compiled by A. E. Ekstrom.

London: Macmillan & Co., Ltd.

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